COAL AGE

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The Only National Paper Devoted to Coal Mining and Coal Marketing

C. E. LESHER, *Editor*

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Massachusetts Lists the Gougers!

THE Legislature of Massachusetts has indulged in anthracite publicity. In an official document traders in anthracite from so-called "independent" sources are named for public censure, the hairline being drawn between "company" coal at $9.50 f.o.b. mines and "premium" product at prices above that magic figure.

With due allowance for politics and the public appetite for coal scandal the data assembled for the Legislature by the Massachusetts Commission on the Necessaries of Life may prove of value, although exception can be taken to some of the conclusions reached. It should be useful to have consumers told officially that from the resumption of mining to Jan. 31, 1923, the ratio of "independent" receipts in Massachusetts to those of "company" coal was but 14 to 86, taking $1.25 over the "company" price as the dividing point. Further, of the eighty-one "jobbers, wholesalers, brokers and dealers" listed as exacting more than $9.50 but two are reported selling in excess of 20,000 tons, and only four as selling more than 10,000 tons. To state it differently, but thirty-four have sold each more than 1,000 tons, and of these, eighteen are parties outside of Massachusetts.

For the good of the industry and in the interest of fair dealing the Legislature ought now to publish the names and tonnages of wholesalers who ship "company" coal. Neither politicians nor the press would be interested and doubtless the items would lack news value, but the complete figures would be enlightening. If lawmakers are to delve into the anthracite business let them favor the "fair-price" wholesalers with equal publicity, that the public may get a more accurate impression of a distribution that 86 per cent merits approbation.

It is reasoned, according to the Massachusetts commission, that "under the prevailing system of the Pennsylvania Fuel Commission for distributing anthracite this large amount of high-price coal has reduced the allotment to Massachusetts of a larger amount of lower-priced company coal. There is no apparent shortage of this high-priced coal." The trade may well question the implication of this statement. "Undoubtedly," naïvely continues the report, "our retail dealers intended by purchasing this coal to increase the amount of coal received by their communities. Their action, however, has apparently resulted only in raising the price of speculative coal and thus the price our householders must pay." This is a philosophy nothing short of artless. No reference to a strike that lasted from April 1 to Sept. 18!

We have no wish to condone speculative premiums on necessaries of life. Undoubtedly there are serious abuses, but by the Massachusetts list the tonnage shipped into that state at prices averaging more than $10.75 was relatively small. Vigilant as proved the war-time Federal Fuel Administration we have our doubts whether even the most meticulous policing would even then have prevented similar abuses in like proportion. It rather seems to us that time is wasted in recriminations over a situation the direct result of five months and a half of idleness in the anthracite region, and not yet a constructive suggestion!

"The Worst Conducted Industry"

SOME time ago Herbert Hoover remarked that the coal industry was the worst functioning of industries. Recently, we believe, he has been weakening in that notion, which was entirely unjustified, as indeed everyone knows. It is a seasonal industry, but there are many others more seasonal and many more that possess that quality in no less a degree.

Now comes John Hays Hammond with the statement that "This industry is the worst conducted, from an engineering point of view, that I have ever seen." The charge is a serious one to make against coal-mine executives, the more serious indeed that it applies to nearly all the more important leaders in industry. This sweeping charge includes Gary, Schwab, Rockefeller and Ford, all of whom are at the head of organizations owning and operating coal mines. It includes many of the heads of the great metal-mining companies, those who rule the destinies of the Phelps Dodge Corporation, the American Smelting & Refining Co., the United States Smelting, Refining & Mining Co., the Chino Copper Co., the Ray Consolidated Copper Co. and the Anaconda Copper Mining Co.

The railroads, the electric-light and power companies, the big byproduct and gas companies, the oil companies, the steel corporations other than those referred to, which are dominated by Gary, Rockefeller and Schwab, also own coal mines. Thus he has denounced the leaders of almost all industry except perhaps his own—that of mining gold. As one scans the situation one would be inclined to believe that the coal mines must be unusually well circumstanced in the matter of executive and engineering talent, because they have had the advantage of sidelights contributed by men from all the industries, for surely each man must contribute something from his especial environment.

No one knows just to what Mr. Hammond refers in his arraignment of the coal industry. That is locked in his bosom. Perhaps it is the eight-hour as against the sixteen- or twenty-four hour day. He has been prone to say that coal mines should operate without surcease every hour of the week. Most of us rejoice that the mines work only eight to ten hours. The world is the better that night is not turned into day. Many industries have seen fit, we are glad to say, to keep largely or wholly to the shorter working period, and in view of the repairs to be made, the roads to be graded and the need for the continuous development

of headings to maintain an eight-hour day, perhaps this method of operation is not such an unfortunate and unprofitable arrangement.

D. C. Ashmead has shown that in the anthracite region the shorter day is preferable economically to the double or triple shift. Coal mines, it is true, work more hours in Europe, but see how much lower is their tonnage per mine and per man. Furthermore, almost all our coal cutting and much of our pumping is done at night, thus lowering the peakload and saving machinery.

If Mr. Hammond refers to the payment by the ton and the fact that with such piece work the interest of the operator and the miner is not so co-ordinated that the former can afford to expend money to assist the latter in producing a large tonnage, there is truth in the statement, though most operators will reply with at least some degree of truth that day work at the face would remove any incentive from the miner to do a good day's work.

Everyone likes to run the mines and the railroads. Any day laborer—a dumper at the mines or a brakeman at the wheel—thinks he could do better than Clingerman or Loree. The average commuter and traveling salesman believes he could handle either mines or railroads better than any man brought up in the business. It is a national failing to declare that we could do another man's job better than he could, but when we try to undertake the work it soon becomes evident that after all the men we criticize know a little at least that we did not know and that the best work in mining or railroading is being done by men versed in the mining or railroading art.

Stream Pollution

MR. CRICHTON'S gloomy prognostications as to progressive stream pollution contained on pages 447-451 of this issue carry the conviction of the writer home to all who read them. Nevertheless some features in future operation promise relief from a difficult situation. One of these favorable features is that most of the workings hitherto have been made near the outcrop, and as mining progresses this shallow coal is approaching exhaustion.

After awhile the coal will be nearly all under heavier cover and the crevices to the surface will be smaller and will close more completely so as to shut off surface waters almost entirely. It is in shallow mines that complete collapse takes place and not in those that are deep. Many of the mines of the future will receive only, or almost only, ground waters; especially will that be true when the surface has completely subsided. On the other hand it well may be that after a few years we may undertake to strip coal along the crops, thus adding to the area of the shallow workings.

As a further reason for hoping that Mr. Crichton's prophecy will be fulfilled only in part is the fact that the mining of the thinner measures, now beginning to look practicable for working, does not produce as much surface disturbance as the mining of those that are thicker. It must be remembered, however, that the thinner they are the more rapid must be the excavation and that there are still not a few thin or dirty beds above those hitherto worked and these will be near the outcrop and have shallow cover. As time goes on these beds tend to be developed, and when they are, they will freely admit surface water and assist materially in aiding that water to reach lower levels.

Evidence also goes to show that not only the seam worked but seams above, still undeveloped, supply sulphurous material to the waters that pass through them and that what is leached from them now will not be present to be leached later. Consequently these upper seams will be less harmful when worked than those we are now working. As against this it must be remembered that the neutralizing bodies also are being removed, and this will tend in a degree to act as a balance to the loss of acidifying tendencies.

Mr. Crichton points out also that after many years old mines tend to give water that is not acidified. He also declares that the area mined is not a complete index of the water received by the underground workings, for, as he well says, the mines are fed by the rainfall of unmined areas as well as of those already mined. In consequence of this second fact the increase in the area draining into mines, new and old, will hereafter be less than in exact proportion to the areas extracted. Unfortunately we lack data of all kinds, especially as to the water entering mines of greater depth where one or more seams are worked, as to the acidity of the waters leaving such workings, as to the nature of water from strippings and as to the length of time after which a mine will cease to acidify the waters it receives.

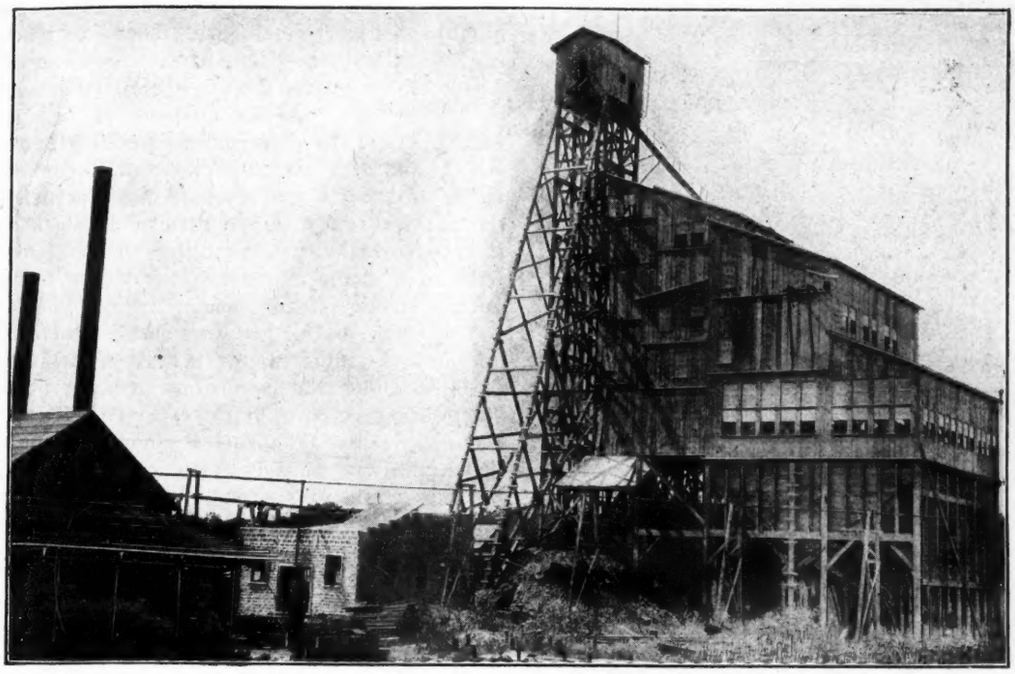
It must be remembered that the acidity per ton of coal mined is not the main interest, but rather the number of grains of sulphuric acid per inch-acre of rainfall, the waters from which pass over the mine workings. If the water from the shaft mine is strongly acid it may nevertheless be in such small quantity that it will have less evil effect on the stream which it enters than the clearer water from the drift mine. The tendency with deep measures may well be to produce a highly acidulous water, but such a small volume of effluent as to overbalance the effect of greater acidity.

Some of our institutions are looking for subjects for study. They might do worse than consider this foundling that so far has had few who would give it parental attention. A study advantageously might be made of a deep shaft operation and of a shallow drift mine to determine which will result in the greater total of acidity, bearing in mind, however, in making a selection, how greatly the presence of limestones may modify that quality.

Two mines in the anthracite region side by side are of equal depth but have totally different waters. One, Pine Hill, has water much more acid than usual. The other, the Lytle Colliery, was some ten years ago using the water from the mine for boiler fuel and did not find it necessary to neutralize the acid. This shows the necessity for caution in accepting comparisons as typical.

The subject is a big one and, as Herbert Hoover says, we should know what we are doing before we legislate. Furthermore, we must remember that all those who are declaiming against this stream pollution are profiting indirectly by the operation of the mines by which the pollution is caused. They can ill afford to make mining unprofitable.

WORK AT WORK.—Secretary Work has ordered that his office door be kept open. The public will thus have a chance to see Work work if it is possible for Work to work while office seekers are trying to work Work.—*Boston Transcript.*



Mining Machines Save Spadra, Arkansas, Field from Extinction After Long Fight with Union

For Years Solid Shooting Made High Percentage of Screenings —Small Quantity of Lump Cut Working Time by Limiting Market—Machine Scale with 7-In. Differential Now Made

BY H. DENMAN
Clarksville, Ark.

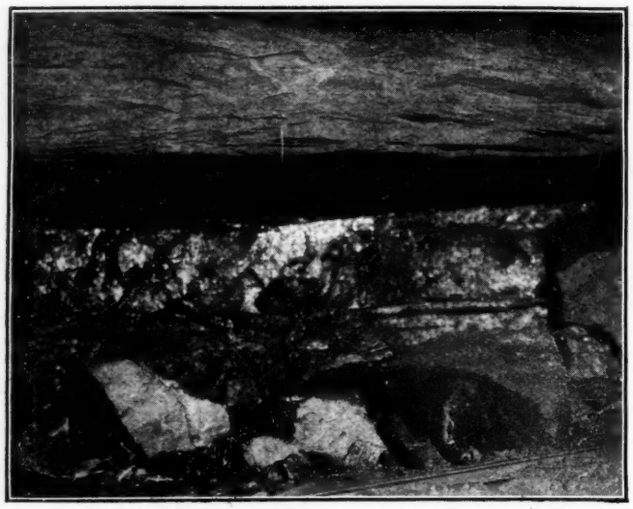
IN THIS age of machine mining it probably will seem strange to most *Coal Age* readers to hear of a field where conditions were favorable to the use of machines yet where a mighty struggle had to be waged within recent years to get them introduced. This struggle against prejudice was so severe in the Spadra field of Arkansas that the entire region was shut down for almost a year on account of it. Nearly four years of battle by the operators against the district and local organization of the United Mine Workers of America was necessary before a machine scale finally was provided. Local conferences and negotiations by the operators and the Southwestern Interstate Coal Operators' Association at Fort Smith, Ark., and at Kansas City, Mo., cost thousands of dollars and much time and effort. But the results may be worth the cost of the struggle.

The operators of the Spadra field appealed to the National Coal Commission appointed by President Wilson and to every official who they thought might help them get a scale, and finally, largely through the assistance of John P. White, representing John L. Lewis, president of the national organization, they were able late in the autumn of 1921 to secure a machine scale allowing them to install mining machines. Even then it would appear that a scale would not have been obtained if the production of an excessive quantity of slack coal under the solid-shooting system of mining and a strictly limited market for low-volatile slack had not compelled the Spadra operators to close down their mines from the autumn of 1920 until the autumn of the year following, when the scale was made. This long spell of idleness, due to market conditions, was a stronger argument for the machines than any talk the operators could make. The percentage of slack had reached startling proportions, so large, indeed, that it reduced the available lump for the domestic market to a seriously low point.

In order to make clear how such a situation could exist, it will be necessary to give a short description of the Spadra coal, the coal field and its markets. Both the district and the coal itself in many ways are unique.

The Spadra district is in Johnson County, Ark. It is only a part of a larger field extending from a point about 75 miles east of the western boundary of Arkansas across the western line of that state and for a distance of about 100 miles into Oklahoma, but the coal

Note—The headpiece of this article shows the breaker and headframe at No. 2 mine of the Fernwood Mining Co., near Clarksville, Ark.



MACHINE MINING MUCH INCREASED LUMP PERCENTAGE

Until recently in the little Spadra field of Arkansas solid shooting in hard coal blew a large proportion of the coal to slack, for which there was a poor market. Today the proportions are much more wholesome, increasing the volume of good marketable lump, thanks to special cutting machines which are a cross between shortwall and longwall. This shows a shot of machine-mined coal, a large percentage of which will afford domestic sizes.

in the Spadra district differs in character from that in the rest of the field. Generally speaking, the coal in the western end of the larger coal area is highly bituminous and high in volatile matter, whereas that in the eastern end is high in fixed carbon and closely approximates anthracite. The Spadra field lies in a basin located near the eastern end of the general Arkansas-Oklahoma coal field and is high enough in fixed carbon for the coal to be classed as semi-anthracite though it is prepared like the hard coals of Pennsylvania and marketed as Arkansas anthracite. Geologically, this coal is in the "Pennsylvanian" or Middle Carboniferous series, and the U. S. Geological Survey in commenting on the coal fields of the state remarks that "Coals of as good quality are not found elsewhere in the United States west of West Virginia."

The following is a typical analysis of Spadra coal sampled and analyzed by the U. S. Geological Survey:

ANALYSIS OF SEMI-ANTHRACITE FROM SPADRA FIELD—AIR-DRIED SAMPLE

Constituents	Per Cent
Moisture	1.03
Volatile matter	10.53
Fixed carbon	80.06
Ash	8.38
	100.00
Sulphur	2.31

The Spadra basin is about 12 miles long in an easterly and westerly direction and 10 miles across from the north to the south outcrop. The coal seam is about 40 in. thick with a band of slate near the center varying from a mere streak to several inches in thickness, the entire bed becoming thicker as the band rock thickens.

The dips are not steep and usually do not exceed 2 or 3 deg. The roof is good, the floor hard, and the mines have little water and not much gas. All the mines of any importance are shafts varying in depth from sixty to three hundred and sixty feet. From this description anyone would say that the natural conditions were favorable for machine mining, and the market conditions even more strongly favor it.

I have already stated that this coal is marketed as Arkansas anthracite, and although the geologists might not so classify it it will uphold the reputation of anthracite and perform the same service as if the prefix "semi" were not written before the word "anthracite." In preparing it for market it is first broken down in breakers or crushers and then carefully screened into five, and sometimes six, sizes, the larger grades being hand picked with much care. The sizes made are grate, egg, No. 4, chestnut, buckwheat (sometimes) and slack. The coal, excepting the slack and buckwheat, are used exclusively for domestic purposes in base burners and furnaces, and the principal market for the coal is in the North and Northwest. The coal burns like Pennsylvania anthracite and just as satisfactorily, but it is not so hard and makes a little more slack and fine coal in transportation and handling. It is smokeless, burns with little flame and maintains a fire for a long time with a strong, steady heat.

The slack, being low in volatile matter, non-coking and screened fine, though a high-grade fuel, is difficult to burn under the conditions existing at most of the steam plants in the Southwest. To get the most satisfactory results as a fuel it should be pulverized and blown into the furnace with a stream of air, the coal burning while in suspension. There are few of these plants, however, and they are expensive to install.

Zinc Smelteries Only Market for Slack

The consequence is that our only market for the slack and for most of the buckwheat is the zinc smelteries, where it is used as a flux in reducing certain grades of zinc ores. With this limited market for slack coal the demand for it is uncertain, depending on the condition of the zinc business. Since 1918 this business throughout the territory that Spadra supplies has not been active, and the demand for slack coal has been greatly restricted. This necessitated stocking coal every year, a portion or all of the slack mined during a part or all of the season being put into the storage pile when the demand for domestic grades of coal was active.

As the coal is used principally for domestic purposes the running time of the mines depends on the seasons, usually starting in the early summer and continuing till near the end of the year. If the mines cannot operate during that season they must lie idle until the one following.

In the past all the coal has been shot from the solid, making an excessive amount of fine coal and the sizes were so badly powder-shattered that they did not stand transporting and handling as coal of this character

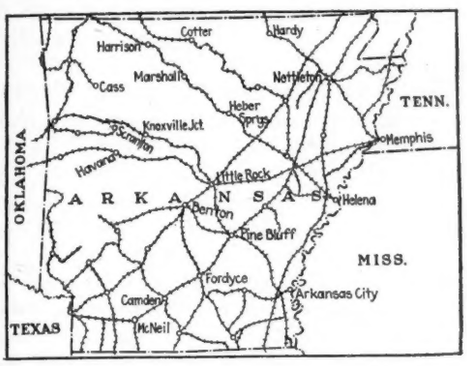
ANOTHER SHOT OF UNDERCUT COAL

As this coal was of a type not readily explosible as unfortunately is most coal in the Southwest, the demand that it be undercut before shooting was not on the grounds of greater safety but on the economic basis that without larger coal the Spadra field would be obliged to suspend operation.

should. As there is little danger that dust explosions will be caused by shots in this coal, charges that the shotfirer would not be permitted to shoot in any other coal bed were used in the Spadra mines to blast coal from the solid. All the coal close to the shots was ground to powder, and the slate band in the center of the bed was so badly shattered that it was almost physically impossible for the miner to separate it from the coal. Most of it, especially where the band was not thick, was loaded with the coal into the mine car.

It is needless to explain that this system of mining produced an excessive quantity of fine coal, for which there was little or no market for long periods at a time. As a consequence the price for the slack coal was low and that for the domestic sizes too high—several times that paid for slack. The operators tried stocking the slack, but such a large proportion of the output came under that head and under that of buckwheat that they found this a losing proposition and "quit it as a bad job."

Years ago this field paid its miners on a screen-coal basis, and this system produced a comparatively small



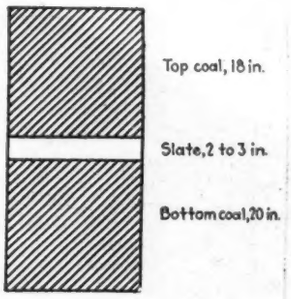
ARKANSAS AND ITS SEMI-ANTHRACITE FIELD

The coal area lies immediately north of Scranton, Ark., in an area so remote from the anthracite region of Pennsylvania that the demand for its product should be considerable.

proportion of fine coal, but through the efforts of the United Mine Workers the state Legislature passed a mine-run law, compelling all coal to be weighed before screening and paid for on a mine-run basis. This law was afterward repealed for Johnson County, but the operators were not able to get another scale for screen coal, so for years they had been obliged to see their coal blown to dust as a result of shooting the coal out of the solid.

Some of the Spadra operators early realized the advantage to be derived from the use of mining machines but there were others that did not believe they could be used with success, so at first the operators were not unanimous in demanding the right to use machines.

In 1918 the Fernwood Mining Co. requested the union through the Southwestern Interstate Coal Operators' Association to provide with a machine scale for a new mine it was then opening. Some of the other operators joined in making this demand for the field. Several conferences were held from place to place without success. Finally, however, early in 1919 the chief commissioner of the Southwestern Interstate Coal Operators' Association and a number of Spadra operators met the district president of the United Mine Workers of America and other union officials and an agreement was made under which a mining machine was to be given a 30 days' trial in one of the mines with a view to determining the practicability of machine mining and the proper basis for the establishment of a machine scale. A standard electric shortwall undercutting machine was furnished by a manufacturer for trial purposes, and the Collier-Dunlap mine was chosen for the test run.



SPADRA SEAM

Two hard and thin seams of coal with a thick binder is the kind of bed to require heavy shooting unless the material is first cut by machine.

Before beginning the test and while it was being conducted there was a constant squabble over details, such as what men should do the work, whether they should be paid by the ton or on a day-wage basis and many other points of difference. Though the test was to be run 30 days, it did not actually run half that length of time owing to the many points of difference that arose. Finally by mutual agreement the test was ended. Though the days during which the machines were operated were comparatively few, many months were consumed in the "test."

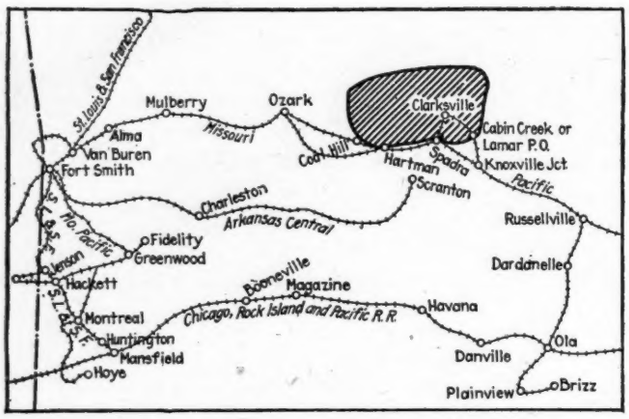
It was of little value, however, for the purpose of making a machine scale, for which it was primarily intended, as the disposition of the local union officials and the men loading after the machines was to do as little as possible, with the hope that they might establish thereby a favorable loading rate. Before this test most of the miners and some of the operators thought the mining machine entirely impracticable for this field, but the actual operation of the coal cutter convinced all the operators and many of the miners that the coal could be undercut successfully by machines and that they thereby would reduce the percentage of fine coal and obtain a cleaner and firmer product. This test was conducted in the spring of 1919.

The next step was to get together with the union officials and make a scale for machine work. Then followed conference after conference, absolutely without results. After trying every means we knew or anyone could suggest, the operators nearly despaired of getting a scale. In the meantime the slack situation had grown worse and some of the operators wanted a screened-coal scale for pick mining or anything that would help to solve the slack problem. They were unable to obtain a reasonable pick scale; in fact the miners did not seem willing to make any change except one that would afford them not only the wage they were receiving but an assurance of an increase in earnings.

In 1920 the market for slack improved and the Spadra mines were able to operate that year, though it was necessary at times to dump the finer sizes on the ground. Though the mines in 1920 were working, the operators' association kept up a continuous fight for a machine scale. During this year one of the operators obtained from the district president an agreement under which another type of machine was to be given a ninety-day trial, but no permanent agreement or scale was made.

With the opening of the coal season in the spring and early summer of 1921 the usual volume of orders was received for domestic sizes but no orders were entered for slack. As a result the operators renewed their demands for a machine scale more insistently and vigorously than before. This time the demand was from every operator, and the mines closed down.

During all these years the operators proposed scale



SPADRA FIELD AND IMMEDIATE SURROUNDINGS

Spadra lies not far from Fort Smith which is one of the leading junction points of the Southwest being served by the Missouri Pacific, the St. Louis & San Francisco, the Arkansas Central, the Fort Smith & Western, the Kansas City Southern and the Midland Valley.

after scale and made concession after concession and every reasonable change was made that it was thought would meet the views of the miners' officials, but it all seemed of no avail. The miners demanded a higher scale for machine mining than had been paid in shooting from the solid. In the matter of yardage especially the miners wanted a big increase in rates and the same rate for loading coal after the machines as was paid in solid shooting, thus leaving the cutting of the coal to be added to the solid-shooting rate.

After the summer was far advanced with no mines in the field operating, the miners' officials asked that negotiations be opened with a view to making a combination pick-mining machine rate, with the rate for cutting and loading hand-picked coal far higher than the solid-shooting rate we had been paying for mine-run coal. The operators declined to go into negotiation, insisting on their original and consistent demand for a machine scale on a mine-run basis based on the solid-shooting rate in effect with a differential of 7c. per ton which they had already conceded.

They looked on the suggestion to make a pick-machine scale as only a scheme to increase the mining rates and felt sure that after the machines were installed most of the miners would load mine-run machine coal, claiming it as hand-picked. Thus the rate would be much higher than for the coal obtained from solid shooting.

It also seemed to the operators that going to a hand-picked coal basis, in which the slack is left in the mines, would prevent largely the monetary advantage of introducing machines, for, though there would be an increase in the domestic sizes, there would be nothing received for slack, because on the hand-picked basis the rate was intended to be high enough to pay the loader for leaving the slack in the mine, and the figure was based on the percentage of slack he made on the solid-shooting system of mining. The mine owners considered also that leaving a large part of the product in the mine was a waste, contrary to good public policy.

As the summer passed with none of the mines in operation, the miners, too, commenced to ask why a machine scale could not be made, as the operators had repeatedly told them that they were ready at any time to make a fair machine scale. The matter had been presented many times to John L. Lewis, international president of the United Mine Workers of America, and finally he took action and appointed John P. White, ex-president of the United Mine Workers of America, as his personal representative to meet with the miners' and operators' representatives in Kansas City. After several conferences, due largely to the influence of Mr. White, a scale was finally adopted in September, 1921, nearly four years after the first demand for a machine scale had been made.

The old rate for mine-run solid-shot coal was $1.40½ per ton of 2,000 lb. with an increase for all coal mined from seams less than 2 ft. 9 in. in thickness. The new scale for machine work was as follows: Loaders, $1.13½, mine run; machine runners, 20c.; differential, 7c.; total $1.40½.

The operators had tried so long and so unsuccessfully to get a machine scale that most of them had nearly given up hope of ever getting one. When the scale was finally agreed to it came as a surprise. No one had found the courage to buy the mining machines and other equipment in advance of the scale except one company, which had purchased two machines on trial.

The season was so far advanced and it would take so long to procure and install the necessary equipment that only a few of the mines tried to operate in 1921 and those that did make the attempt ran only about ten days.

It is impossible to estimate the loss sustained by both the miners and operators by this long delay in making the scale. Both know, or should know, that they lost heavily on account of the protracted idleness and even more in the loss of patrons, who, due to the inability of the operators to furnish them coal in 1921, had been forced to use other kinds of fuel.

Now, however, all the principal mines of the field have installed machines. One mine uses shortwalls cutting along the bottom of the seam. In nine other mines the machines are a combination of shortwall and longwall. These work as shortwall cutters with the bar about on a level with the top of the machine body. This bar is supported by a sort of underframe. This places the cutter bar so that it can mine out the slate and band rock in the middle of the seam. Light shots bring down the upper and raise the lower bench. This plan greatly increases the percentage of lump, practically reversing the old proportion of the sizes. Machines also remove most of the band rock so that the cut is made in refuse material and not in good coal. As the result of their improvement in the regularity of the work and their better pay, even the miners are losing their former resentment.

The coal is cleaner, more of it is marketable, and it is expected that the running time each year will be much greater than it ever was before now that more lump coal is produced. Machines finally came when it seemed that the operators must have them or quit business. Perhaps they saved the field.

DEMONSTRATIONS OF THE EXPLOSIBILITY of machine coal cuttings have recently been made at the Pittsburgh, Pa., experiment station of the U. S. Bureau of Mines for the chief of the mining division of West Virginia. The explosibility of starch and aluminum dust was also recently demonstrated. A general program for the scientific study of the propagation of coal dust explosions, which has been given consideration, includes a study of the time factor in the combustion of coal-dust particles, and the method for determining pressure; also a study of the influence of ionization in the propagation of a dust explosion.

Refuse from Picking Table Crushed, Cleaned and Used In Boiler Furnaces at Graham, Ky.

Tipple Refuse Too Poor to Use for Raising Steam Passes Through Crusher and Over Reciprocating Table and Makes Salable Fuel at Cost of Less Than a Dollar a Ton

By Charles M. Means*
Pittsburgh, Pa.

THE relatively high cost of producing coal has introduced new and varied problems and warrants resorting to expedients that were impracticable a few years ago. The bituminous-coal industry is destined to follow the practice of the anthracite field in reclaiming valuable fuel from refuse piles and from the material separated from the product of the mine in course of its preparation for the market.

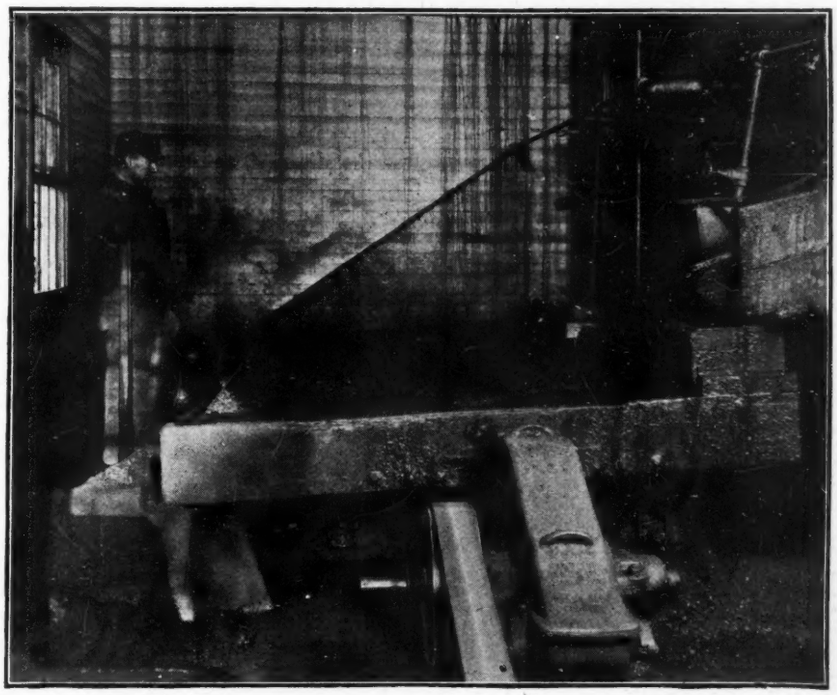
At the plant of the W. G. Duncan Coal Co. about 80 tons of refuse is separated every working day from the coal delivered to the tipple. This refuse contains so much impurity that without being cleaned it cannot be used for fuel in any known design of furnace. Consequently until recently it was the practice to remove this material to a waste pile at a cost of about 25c. per ton. The following analysis of the refuse shows that it contains much good coal that would burn if the impurities were in part removed:

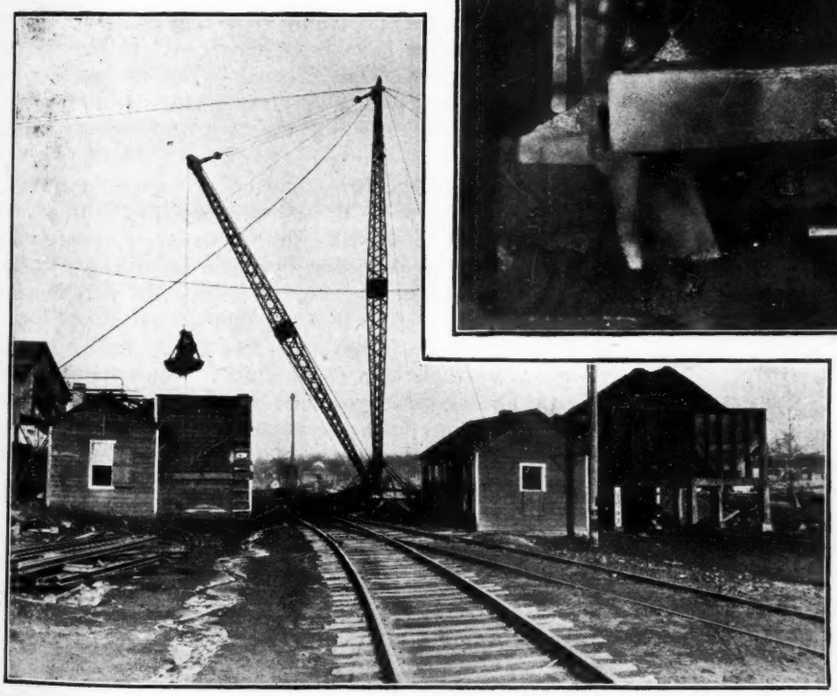
CRUSHED REFUSE FROM PICKING TABLES

	Per Cent		
Moisture	5.50	B.t.u. per lb.	9,960
Ash	21.95	Sulphur, per cent	12.02
Volatile matter	32.87		
Fixed carbon	39.68		
	100.00		

Refuse Washing Plant

The coal from the picking tables is crushed and transported by the derrick to a bin, from which it is fed to a reciprocating table, where the coal is cleaned. The clean coal goes to the boilers or even to the market, and the waste, about 30 tons a day, is taken by trucks or railroad cars and dumped.





Concentrating Table

The refuse is classified into clean coal, slate and sulphur. The clean coal has the ash reduced from 22 per cent to 6½ per cent. The sulphur content, which ran 12 per cent, falls to 3½ per cent. The sulphur and slate at present both fall into a common bin and are dumped to waste together.

After an investigation it was decided that an attempt should be made to clean the refuse so that it could be used in a power plant owned by the same company and located near by. For its preparation a hammer-type crusher and a concentrating table were installed. A guyed derrick was erected and furnished with a clam-

*Consulting engineer.

shell bucket. This derrick removes the crushed tipple refuse from the crusher to a bin over the concentrating table and the coal from the washed-coal bin below that table to an elevated bin from which it is taken to the boilers. It is used also for transferring the refuse of the reciprocating table to trucks or railroad cars for disposal.

The refuse is delivered from the tipple to a bin over the crusher, to which latter it is fed as required. After the coal has passed through the crusher it falls into a bin beneath it. It is then removed by the derrick to another bin at the concentrating table, where it is fed onto the table and the separation of the coal from its impurities is made. The bone and sulphur fall into one bin, and the coal falls into another.

Derrick Always Ready to Place Coal as Needed

The coal is picked up by the clamshell and placed in an elevated bin and loaded by gravity into industrial cars and delivered to the power plant. However, if more of the cleaned product is being made than the power plant requires, it is stored in a pile, to be picked up when the mine is not in operation or at some time when the supply of refuse from the tipple is insufficient to meet the needs of the boiler furnace. The moisture left in the coal after its preparation is not excessive and has no deterrent effect on its use in the stoking equipment.

The analysis of the coal thus saved from the tipple refuse is as follows:

CLEAN COAL PREPARED FROM TIPPLE REFUSE

	Per Cent		
Moisture	7.40	B.t.u. per lb.	12,362
Ash	6.57	Sulphur, per cent	3.63
Volatile matter	38.68		
Fixed carbon	47.33		
	100.00		

The results attained in the burning of this product have always been as good as and perhaps better than are obtained from the combustion of the regular screenings from the mine. Some of the coal thus recovered has been shipped on regular orders for screenings, and no complaints have been received from any of those to whom such shipments have been made.

Sulphur Recoverable When Occasion Requires

The sulphur thrown off by the table goes into the same bin as the bone and shale but at a different point. It will be a simple matter to recover the sulphur separately and in a sufficiently pure state for the manufacture of chemicals. At the present time the market for this material is such that the separation of the sulphur hardly is warranted.

For the various operations two men are required, one at the derrick and one at the concentrating table and washer. The labor cost is 75c. per ton of recovered coal, the power cost about 5c. and the overhead about 10c., making a total cost of about 90c. per ton of coal recovered. In other words, the separated clean coal costs only about 65c. per ton more than the cost of disposing of it as refuse, the final result being that on an average 50 tons of commercial coal is recovered per day at a relatively low cost.

This equipment has been in use about two years and the results have proved uniformly successful under various operating conditions. It is reasonable to suppose that plants of this character can be installed at many mines throughout the bituminous fields and operated at a real profit.

Basic Average Figures on Anthracite Industry Made Available

By R. V. Norris

In its foreword, entitled "The Vital Need—Information," *Coal Age* of Feb. 8 said: "Industry and the world at large require facts for safety. It is the function of the engineer to supply these facts."

In the series of articles by Mr. Ashmead on "Anthracite Mining Conditions," started by him in the Feb. 22 issue of *Coal Age*, a long stride is made in furnishing in available form basic average figures applying to the industry.

Mr. Ashmead has reduced to easily studied diagrams the figures as to thickness and depth of beds, boiler equipment, transportation and, most important of all, labor output in tonnage from analysis at five-year periods, from 1872 to 1922, of the very complete reports of the Inspectors of Mines of Pennsylvania.

From these diagrams can be traced the changes in the industry through half a century of progress. As would be expected, the average thickness of coal worked shows a general decrease, and of depth of workings an increase, modified in some sections by extensive strippings and second mining of old surface workings. The rather startling increase of two and one-third times in the tons produced per mule does not indicate that the hay burner has become two and one-third times as efficient but that he probably handles less than one-third of the output now compared with his monopoly in 1872.

In the labor efficiency a marked increase in tons per day per outside man reflects the improvement in machinery, particularly in the introduction of mechanical picking, replacing boys in the breakers. The reduction in efficiency of inside employees probably is partly due to conditions and partly to actual decreased effort.

Similar articles have been prepared treating each of the mining districts in the same general manner, so that the series gives a very complete history and analysis of practice, showing the fluctuations and changes of half a century of experience.

The value of the investigation lies not only in making available valuable data previously buried in a mass of reports but in showing the tendencies for the future and in giving a basis of comparison for different operations by showing the average conditions and requirements of each region in clear and easily studied form.

These curves can and should be used by all operators to check up their own production results by comparison with their regional averages, modified by comparison of their conditions with the regional curves of depth and bed thickness. The curves will be found of great value in studying property values and particularly in forecasting the results of future changing conditions.

This work of Mr. Ashmead shows what can be done in making readily available huge accumulations of statistics, and points to a valuable service which the government should do in making its collections of data available for practical use. With the way thus blazed by private enterprise the work should be continued and extended.

Additions, removals and changes in the permissible list of explosives from March 15 to Dec. 31, 1922 are given in Serial 2,430, by S. P. Powell, explosives engineer, which was issued recently by the U. S. Bureau of Mines. The list supplements that contained in Technical Paper 307, issued in March, 1922.

Administration of Laws Regulating Conditions in Mines*

Best Results Obtained by Appointing Inspectors Through Rigid Examination, Then Giving Them Real Authority and Reasonably Secure Tenure of Office—Supplementary Regulations Should Be Alterable to Suit Changing Conditions

By E. A. Holbrook†

OUR present mining laws and codes and their administration are a growth and evolution from the older mining customs and laws of Great Britain. Today, of the coal mining codes of the various states, the Pennsylvania bituminous code is the most complete and has been the framework for the provisions and administration practices of the codes of many other states. Pennsylvania has no mining code covering ore mines and quarries, and no code to regulate petroleum and natural gas production.

The best results in administration of mining codes have been gained by appointing inspectors through rigid examination, then giving them real authority and reasonably secure tenure of office. In any mining code, instead of a collection of detailed laws whose change is difficult, it is desirable to have a body of law, supplemented by regulations which may be altered by conference of all concerned, without legislative action.

The administrative relationships of the workmen's compensation insurance inspection and merit-rating work to the state mine inspection service are supplementary and may, in a state where mining is a great industry, be operated to advantage separately without conflict or duplication.

Time to Legislate on Coal Conservation

The time has come to consider introducing into mining codes factors affecting conservation in mining the irreplaceable resources, especially coal, to be administered under the public or state department. A great state department should contain specialists to investigate and advise in the varied engineering technical problems increasingly encountered in the administration of the mining codes.

In no way can greater help come in the administration of our mining codes than by the more systematic and general training and education of the masses of the men in the industry in the elements of mining science and art that are vital to their safety and advancement, and in upbuilding the industry.

A complete State Department of Mines should administer at least the following bureaus: (1) Coal-mine inspection; (2) ore mines and quarries inspection; (3) petroleum and natural-gas production inspection; (4) mineral conservation; (5) miners' compensation insurance; (6) miners' instruction and training; (7) mine engineering and research.

The subject as first suggested was "A Code of Standard Practices in the Administration of Mine Inspection Laws." I prefer the present title, for, due to the great diversity of state mining laws in this country and more particularly the coal-mining laws, codes or regulations as they exist in twenty-nine states today, no one man is qualified to recommend a best definite detailed code to cover the great differences in practices and administration occasioned by the multitude of different conditions underground.

The more one deals with the American coal industry, the more one becomes impressed with its vastness and complexity and realizes that facts and physical conditions important in one district or state often are of minor importance in another. In general, coal-mining codes vary from state to state, not only in completeness and effectiveness but in substance and in operation.

New Laws Should Be Outcome of Conference

Thus before devising acceptable codes of procedure or altering practices dealing with mine-inspection laws it is wise to bring together for extended discussion men in the industry with wide general experience, others familiar intensively with special local conditions, specialists in modern underground machinery and appliances, the miners and the operators as most directly concerned, the experienced inspectors and the representatives of the public. Modern mining codes based on these considerations have been put in operation within recent years in Great Britain and in several of our states.

Get clearly in mind that from the earliest days mining has been considered an industry apart and by itself, its people a group distinct from the general worker in many thoughts and habits, and that it was practically the first industry generally to have codes, regulations and inspection, especially as concerns the safety, health and working conditions of the employee and his relations to the employer. When men go underground, new and unfamiliar hazards appear, new problems concerned with the conservation of life and properties arise. One man's actions may endanger the life of every man underground in the mine.

New Conditions Call for New Legislation

Our modern coal-mining laws and codes are built mostly on older ones which had their beginnings several hundred years ago in the coal-mining districts of England. Here, as men dug deeper into the earth, local rules and customs developed as safeguards to property and life underground which after a time became in effect the common laws of mines. At first these laws dealt with property rights and had little regard for protection of life. It was not until 1850 that the laws providing for government inspection of mines were passed. In 1872 many of these common customs and laws were absorbed into a general coal mines act applicable to all of Great Britain, but with individual districts still able to regulate for special local conditions. Many amendments and additions have been made since, necessitated by the revolution in mining brought about by the introduction of modern machinery, and tending strongly in administrative features toward greater centralization of and increase in authority, duties and independence of the Central Department

*An investigation made for the Director of the U. S. Bureau of Mines and published with his consent.

†Dean of the School of Mines, Pennsylvania State College; formerly assistant director of the U. S. Bureau of Mines.

of Mines; and laying increasing emphasis on the fitness of inspectors and administrators of the laws, through competitive examinations for appointments to such positions.

In Germany the history of the origin and development of coal-mining codes has been similar excepting for a fundamental difference in administration policy —i.e., in Germany and other Continental countries a mine manager may not undertake any new action or work whatsoever without the approval of the government department, whereas in England the theory has been that an individual operating a mine could continue to use his own initiative and judgment in mine development and operation so long as he observed the minimum requirements of the law as found in the codes and regulations.

In this country, largely because our first miners came from the mines of Great Britain, we have developed our codes and their administration on the English theory and groundwork. The first state laws here governing coal-mine operation and inspection were passed for the anthracite district of Pennsylvania in 1869 after efforts extending over more than ten years, and were broadened by acts of 1870 and 1871. Ohio in 1874 passed the first acts providing for state inspection and regulation of bituminous coal mines. Next, in 1877, Pennsylvania enacted laws governing mine operations and providing for state inspection for the bituminous-coal region. This bituminous code, together with its many amendments and revisions, has been the basis for practically all the coal mining codes in the rest of the twenty-nine states where coal mining is an industry. Especially noteworthy in Pennsylvania have been the revisions of the code to meet the needs brought about by modern conditions of working and the introduction underground of new appliances. For example, the use of electricity, which as it develops brings new and unknown hazards underground, is more extensively covered by the Pennsylvania bituminous code than by that of any other state.

A Mining Code Must Contain Much Detail

While the length of a state mining code is not a safe measure of its value yet, other things being equal, it may give a measure of scope, attention to details and diversity of conditions to be administered. Thus the Pennsylvania bituminous law heads the list with about 43,000 words, followed in turn by Ohio with about 40,000, Illinois 36,500, and the other states in decreasing sequence. The new federal Bureau of Mines regulations to govern operations on the public domain coal lands of the West and to properly conserve the coal therein have about 19,000 words, but in part fit into and supplement the codes of the various states in which this mining is conducted, and are therefore not detailed as to many methods and duties generally considered in state codes.

The essential object sought in the American codes is the safety and health of the miner, with minor emphasis on protection of property. I venture to emphasize that the time has come to give more attention to economic factors in coal-mining codes, having the object in view of compelling more systematic and modern methods of mining coal in order to extract the largest possible percentages of the coal before abandonment of the mine. It is true that operators of some mines now extract all the coal possible and that others will follow when it becomes profitable to do so, yet should not the decision as to whether or not certain coal should be mined or lost be from the standpoint of conservation of an irreplaceable resource rather than from the economic profit viewpoint, and a matter to be entrusted to the public administrators of our mining codes? It would mean true conservation of our resource, hand in hand with our present efforts at conservation of life.

The administration of coal-mining codes is universally in the hands of a chief inspector, having greater or less power and responsibility, according to the state. He generally is appointed by the Governor of the state, without examination for fitness and upon his general record and reputation as a mining man, although a few states make definite technical qualifications a prerequisite. The chief is assisted by deputy or district inspectors, whose duties, powers, qualifications and fitness vary widely in the various states. Since the test of a law is its enforcement, the choice and methods of appointment of a state inspection service whose duties are entirely those of administration and enforcement of the laws are equally important with the provisions of the code itself.

Pennsylvania and Illinois Inspectorates

Following English custom, Pennsylvania was the first state to appoint inspectors based on examination for fitness. Later, as the number of inspectors increased greatly, the inspection service was brought under a State Bureau of Mines (1897) and then, with prophetic vision for the necessity of a greater service to handle the greatest and most specialized of the industries, a Department of Mines was created (1903). The Pennsylvania mine-inspector examinations have, as the industry developed, been made more severe, and are generally acknowledged as being of advanced high grade and models for the examinations of many other states. In Illinois the first mine inspections were made by county surveyors who were politically elected officers. Afterward in 1883, a state inspection service modeled on the Pennsylvania laws was enacted, without, however, doing away with the county designated mine inspectors. Some counties still have their own appointed inspectors, who, however, act as deputies to the state inspectors.

In 1901 for the anthracite districts of Pennsylvania the method of electing district inspectors from a list of those who had obtained certificates of fitness was put into operation. Recently (1921) the return was made to the appointive system after examination. The elective system of selection of inspectors has not been adopted generally, although in Oklahoma, following a provision inserted in the state Constitution in 1907, the chief state inspector and the district inspectors are elected as a part of the regular party ticket. In Kansas for a time the chief inspector was elected by elected delegates of miners, but since 1913 the appointment has come under a Commissioner of Labor and Industry.

For the country in general coal mining would today be a better and a safer industry were inspectors in every state chosen as for the bituminous region of Pennsylvania, through strict examination in principles and practice of mining, at a salary sufficient to attract high-grade men, and freed from any influence save those listed in the laws and that of their superior officer, and expectant of holding office until retired by natural causes. A high grade of inspection service should exist in all districts of the country and be backed up by putting "more teeth in the laws," by giving increased author-

ity to the inspection service and by pensioning its members when they can no longer perform the arduous duties exacted by the work.

It is encouraging to record that, even in the case of the chief, usually appointed by the Governor of a state, there has been a more marked tendency during the past few years to depend on merit for continuation in office. In one case recently a state Governor reappointed a chief inspector who had been appointed first by the preceding Governor of opposite political party. Maryland even provides for a permanent man to head the department who is appointed by the Governor from a list of five persons who have passed strict civil service examination for competency. British Columbia elects a Minister of Mines who has under him a complete organization whose members are removable only through cause. To my mind, a better mine-inspection service may be built up through continuity in office of men able to build and maintain firm policies through a considerable term of years rather than through the frequent changes taking place in some states. I am totally unable to see how matters that concern the life or death of a miner should concern politics.

Some Boards Group Mine with Other Safety

During the past few years the great new factor in the administration of mine-inspection and safety work has been the coming of workmen's compensation insurance for miners, its influence on mine safety and the relationships of the industrial commissions administering the compensation insurance and inspection to the administration of the established departments of mines and related inspection service. Thus, in Wisconsin, California, Utah, Ohio and in several other states in which mining is of minor importance the State Mining Bureau or Mines Inspection Service no longer constitute major departments reporting direct to the Governor but have been merged into a major department known as the Industrial Accident Commission or Bureau of Labor and Industry or by similar name, which generally combines mines, factories and other state inspection, together with the enforcement of the various workmen's compensation acts. On the other hand, Colorado, Illinois and Maryland in revising their state departments within recent years have kept their mine-inspection departments practically independent, although combining many forms of inspectional work.

The workmen's compensation insurance inspection is related to coal-mine inspection and mine safety as follows:

Attempts were made at first to insure mines, either through state funds or private companies by a straight tonnage tax or by a tax based on the payroll. This, while applicable for states having only a few mines of similar character, did not make allowance for the wide variations in hazards, as for example, between a small mine with safe natural conditions and a large badly operated mine with gas, a bad roof and possibly other natural and moral hazards. It was as if the same fire-insurance premium rate should be assessed on a fireproof structure and a wooden shack. Consequently the system of merit rating of coal mines for safety standards for purposes of equitably assessing compensation-insurance premiums was worked out by the Mining Department of the Associated Insurance Companies in co-operation with the U. S. Bureau of Mines, and the system has been adopted as the most equitable for coal-mining insurance. All known mine hazards are listed and charged for with allowance or deductions for their non-existence or elimination at the mine in question. Thus for the first time the direct cost of a mine with low safety standards is brought home to the operator. The system has proved a real safety incentive.

Considerable discussion has taken place as to the administrative relations of this compensation-insurance inspection work to the regular work of state inspection in a Department of Mines, and so as to the advisability of grouping it with the regular state mining department inspection work. Undoubtedly, in states where mining is a minor industry, requiring at most two or three inspectors, some form of amalgamation or co-operation with state accident compensation departments is feasible. Another good point is the argument that those who pass on safety are in the best position to pass on accidents.

One of the difficulties of the regular state mining codes is that generally they are laws enacted by the Legislature, and their change or repeal as mining conditions change often is a difficult matter. On the other hand, the states of California and Utah, with mine inspection grouped with the state accident or industrial commissions, have, instead of fixed mining law codes, a body of regulations arrived at after consultation of all interested parties, and they are fairly easy to change when new conditions arise. This desirable feature, however, need not be limited to states where the mine-inspection service is affiliated with the accident commission. Without regard to the organization of a State Mining Department, it is difficult to understand why, in a highly developed and specialized art like mining, courts and legislatures should have to be educated to the needs of the industry before changes in codes can be made. A real danger in amalgamation is that of having mining policies passed upon by men who are primarily not mining men.

Merit Rating Spurs Operator Only to Safety

A study of the question in any state where coal mining is one of the important industries shows that the functions of the state mining inspection service and the inspection of mines for insurance merit rating are supplementary rather than duplicating or overlapping. The insurance inspection is an incentive to the operator only to lessen his individual hazards by economic persuasion. It follows a regular schedule, has no police power and is special work for a special purpose. It is an added incentive to increase safety above the minimum standard rather than a basic one affecting all interests. Its basis is the business of insurance. On the other hand, the regular inspection service must enforce a code of mining requirements for safety based not on economic factors but on the relationship of human society in underground hazards and conditions. Its edicts must bind miner as well as operator. Its inspectors must have real police power. Their technical knowledge must govern and decide many points not involved in the compensation work. They must spend much time on the technical side of the work, in interpreting and applying all codes and regulations with justice. They are in fact the sheriffs of the mines, often with the added power of judge and jury. In addition there is still a gap in compensation inspection through the large companies electing to carry their own risks.

Before long state mine-inspection services should have a new duty to perform, that of conserving those

resources of coal which so much in the past have been wasted by careless mining, owing largely to economic factors beyond the inspectors' control at present. For the benefit of the coming generations, should not laws require the extraction of a maximum percentage of the coal resource before abandonment of a mine? A simple statement and yet its enforcement means building a new code of mining laws and a new conception of the individual right to mine, yet one which must come, even before it is profitable to take such care.

It is pertinent that other states with ore, mineral and clay mines and quarries comparable with Pennsylvania have special mine inspection services to serve them. Pennsylvania has none. Also California and other Western states have found it in public interest to provide state agencies to regulate petroleum and natural-gas production, technology and conservation.

You all know that Pennsylvania is the great coal-mining state of the Union, producing last year about 40 per cent of the tonnage of the country and the value of which was about one-half of the value of all of our coal. Pennsylvania alone produces more coal than any foreign country excepting Great Britain, and is scarcely behind her. Yet the technical side of the coal industry in Great Britain is recognized by a major department in the home office of the British Government with a Secretary of Mines. Surely in Pennsylvania with the technical mining problems, the enforcement of the laws and the industry itself becoming more important each day and requiring at present 55 inspectors, it is vital to maintain and build up a still greater Department of Mines.

Departments of Mines Should Have Experts

Under modern mining conditions a large state department of mines is called upon to decide complicated engineering and technical questions involving standards of electrical, mechanical and chemical appliances, of passing upon highly specialized machinery and eliminating its hazards. Problems increasingly arise calling for investigation and research in general and of local conditions involving mine gases, ventilation, mine supports and other special and often unknown factors. For this work the department should have at its command specially trained men with a knowledge of engineering and research in the mines.

I believe the greatest help in the administration of our mining codes must in the future come from more intensive instruction and education of the masses of men engaged in the industry. In Pennsylvania alone coal mining commands an army of nearly 400,000 men. Tens of thousands of new men are enrolled each year and in increasing numbers. This expansion of our coal industry has caused a scarcity of men trained in those elements in the science and art of mining which is rightly required by the Pennsylvania laws before a man may be a mine official or an inspector.

The introduction of machinery, the added dangers from gas and dust as our mines grow larger and deeper and the coming necessity of preventing waste of our great non-replaceable resource all demand more trained officials and miners. Practical men are needed, but the time necessary for them to become competent workmen and officials can be greatly shortened by instruction such as is common in most foreign coal-mining countries. This training to interest the men must in turn be given by practical mining men. It is useless to make mining codes and regulations which are beyond the grasp of the mass of people they affect. Looking to the future, administration of our improved and broadened laws and codes for increased safety and efficiency should first require that to every man and boy in the mines a place and way must be offered where he can, if he chooses, acquire under practical and trained men the knowledge necessary to safeguard himself and his fellow workers and to advance himself without limit in the various positions of responsibility in the industry.

Finally, to make complete any great state department by including in it all the related services mentioned in this paper, and to form a plan for building up and administering a service which must grow and expand, I recommend a central Department of Mines to include at least the following bureaus: (1) Bureau of Coal Mine Inspection, (2) Bureau of Ore Mines and Quarries Inspection, (3) Bureau of Petroleum and Natural Gas Inspection, (4) Bureau of Mineral Conservation, (5) Bureau of Mine Compensation Insurance, (6) Bureau of Miners Instruction and Training, (7) Bureau of Mine Engineering and Research.

Thirty-four States Have Fuel Directors

Of the forty-eight states in the Union all but fourteen have State Fuel Administrators or another official appointed by state authority to regulate the distribution of coal during the present emergency. In one of these fourteen states, Connecticut, the Administrator, T. W. Russell, recently sent his resignation to Governor Templeton.

The states having Administrators, with their names and addresses, follow:

State Fuel Administrators

Alabama—William A. Darden, State Fuel Administrator, Montgomery.
Delaware—Leon Walker, Chairman, Delaware Coal Commission, 1020 Church Street, Wilmington.
District of Columbia—Walter C. Allen, Executive Secretary, Public Utilities Commission, Washington.
Florida—Florida Railroad Commission, Tallahassee.
Georgia—James T. Boifeuillet, Commissioner, Georgia Public Service Commission, Atlanta.
Illinois—Robert M. Medill, State Fuel Administrator, Chicago.
Indiana—J. W. McCardle, Chairman, State Distribution Committee, Indianapolis.
Iowa—Charles Webster, State Fuel Administrator, Des Moines.
Kansas—Court of Industrial Relations, Topeka.
Kentucky—J. Sherman Cooper, Chairman, Kentucky Railway Commission, Frankfort.
Louisiana—John G. O'Kelly, Fuel Distributor for Louisiana, Baton Rouge.
Maine—Andrew P. Lane, State Fuel Administrator, Augusta.
Maryland — William Milnes Maloy, Chairman, Public Service Commission, Baltimore.
Massachusetts—James J. Phelan, Massachusetts Emergency Fuel Administrator, State House, Boston.
Michigan—William W. Potter, State Fuel Administrator, Lansing.
Minnesota—Ivan Bowen, State Fuel Administrator, St. Paul.
Mississippi—Mississippi Railroad Commission, Jackson.
Missouri—Hugh McIndoe, Chairman, Missouri Coal Distribution Commission, Jefferson City.
Nebraska—H. G. Taylor, Chairman, Nebraska State Railway, Commission, Capitol Building, Lincoln.
New Hampshire—Charles M. Floyd, State Fuel Administrator, Manchester.
New Jersey—Wm. J. Grier, State Fuel Commission, Trenton.
New York—General George W. Goethals, New York State Fuel Commission, 165 Broadway, New York City.
North Carolina—R. O. Self, Director, State Fuel Commission, Raleigh.
North Dakota—Frank Milhollan, Fuel Director and Distributor, Bismarck.
Ohio—George T. Poor, Chairman, Public Utilities Commission of Ohio, Columbus.
Pennsylvania—William D. B. Ainey, Chairman, Pennsylvania Fuel Commission, Harrisburg.
Rhode Island—George H. Webb, State Fuel Administrator, Providence.
South Carolina—Frank W. Shealy, Chairman, Railroad Commission, Columbia.
South Dakota—J. J. Murphy, State Fuel Administrator, Pierre.
Tennessee—Wilbur A. Nelson, Chairman, Tennessee Coal Commission, Nashville.
Vermont—Hugh J. M. Jones, State Fuel Administrator, Montpelier.
Virginia—Major Alexander Forward, State Fuel Administrator, Richmond.
West Virginia—J. Walter Barnes, State Fuel Commissioner, Charleston.
Wisconsin—P. H. Pressentin, Chairman, State Coal Committee, Madison.

The states besides Connecticut that have no Fuel Administrator are: Arizona, Arkansas, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah and Wyoming.

What Shall Be Done About the Growing Evil of the Pollution of Streams by Mine Drainage?*

Review of Proposed Laws—Neutralization of Waters Discharged Into Ohio and Its Tributaries Would Require Even Today a Million Tons of Lime Yearly—New Mines Increase Acidity—Actions in Law Courts

By Andrew B. Crichton
Johnstown, Pa.

NO MORE important question has come before the coal industry in the past decade than the prevention of stream pollution by mine drainage; especially in Pennsylvania, where large areas of coal land have been developed. It may be thought that the problems of labor or lack of transportation outweigh in importance that of stream pollution. We can see possible remedies for labor and transportation problems but there is no known satisfactory solution of the mine-drainage problem. The subject has been given little serious attention, for until recently it has been little understood; but in the past year it was brought to the attention of the coal-mining industry by the introduction in Congress of several bills designed to prevent discharge of acid waters from mines or other sources into navigable streams or their tributaries.

The first legislation proposed was the Appleby bill, H. R. 7,369, designed particularly to prevent the oil pollution of coastal waters. It contained the following provisions, which the coal men regarded as applicable to the coal industry:

> It shall be unlawful to throw . . . any refuse matter of any kind . . . into any navigable waters of the United States or into any tributaries of any navigable waters from which the same shall float or be washed into such navigable waters.

The chemical, steel, paper and other manufacturing industries, as well as the mining industry, objected to this clause, the mine operators contending that it would prevent the discharge of waste or mine drainage into any waters of the United States, for all streams or tributaries finally reach navigable waters.

The next bill introduced was that of Congressman Briggs, H. R. 7,430, an amendment to Sec. 13 of the Pollution Act of March 3, 1899. The original act referred chiefly to oil and oil refuse, but it provided also "that no material of any kind should be deposited on the bank of a navigable water or tributary which might reach the waters and interfere with or obstruct navigation." This last provision could be said to apply to mine refuse, which would produce highly acid drainage.

The Rosenbloom bill, H. R. 8,733, also an amendment to the act of March 3, 1899, provides that it shall not be lawful to deposit or discharge from "any source whatever any free acid or acid waste, or anything that may become acid after being deposited into navigable waters or tributaries of the United States." Under this bill army engineers may prohibit the discharge or may regulate the entrance of wastes or may require the treatment of such discharge to destroy its acidity. This bill aims at the mine drainage entering the Ohio River and its tributaries.

The first draft was proposed by Major General Lansing H. Beach, chief engineer, United States Army. General Beach, in his report, states that the treatment of acid mine waters is so simple and inexpensive a matter that he believes there will be no opposition on the part of the owners of mines concerned. He suggests that lime be deposited in a small box, to be built at each mine opening, through which the mine water would flow, thus neutralizing the acid.

J. T. Travers, supervisor of streams, fish and game division, State of Ohio, in the same report states that the equipment will cost about $65 for each opening and the supplies from 75c. to $1 per day. It developed, however, at the hearing held in Washington that the Travers system was applicable only to manufacturing plants discharging 3,000 to 7,000 gallons per day.

Mr. Travers thinks that coal-mine drainage is not so bad as that from manufacturing operations and that it would be comparatively simple and inexpensive to treat mine drainage. He apparently has not considered seriously the statements of mining engineers as to the enormous quantities of acid mine water daily flowing from the coal mines of the country. There would be no opposition to treatment in this manner if the problem were as simple and inexpensive as indicated in the foregoing paragraphs.

Ohio Receives 2½ Million Tons of Acid

The Chemical Alliance, in a report made at the request of the chief engineers of the United States Army, stated that 6,500 tons of sulphuric acid is discharged into the Ohio River and its tributaries every day, or 2,357,500 tons per annum, or nearly half as much as is now produced in the United States. Neutralizing this amount of acid would require 3,250 tons of lime per day, or 1,170,000 tons per annum.

Charles Dorrance, vice-president of the Hudson Coal Co., whose thirty mines produce 9,000,000 tons of anthracite annually, has stated that these mines pumped 15 tons of water for each ton of coal produced and that neutralization of the water of the anthracite region, basing the estimate on the cost to this company, would require an initial expenditure for installation of $39,000,000 and that the annual operating expense would be about $18,000,000.

Mr. Dorrance estimated that the mine drainage from the fields of the anthracite region was 700,000 gallons per day; and that neutralization would add to the consumer's bill about 50c. per ton. P. C. Madeira, of the Anthracite Coal Operators' Association, estimated that an average of 18 tons of water was hoisted or pumped for each ton of coal.

The act of 1899 placed the matter in the hands of the army engineers, but at the Congressional hearing the question was referred to the Department of Commerce for investigation and report; thus at the start jurisdiction is rather confused. In Pennsylvania Governor Pin-

*Article entitled "Mine-Drainage Stream Pollution," presented at the February meeting of the American Institute of Mining and Metallurgical Engineers, held in New York City.

chot has promised legislation to prevent stream pollution. Various Congressional candidates have based their claim for election on this issue.

The problem of pollution is squarely before the industry. It is important, it is serious, and the difficulties of the situation should be understood by the country, and more reliable data should be obtained on which to base proper legislation. Otherwise laws will be enacted that will become a burden to industries and the people as a whole. Already stream pollution has been a cause of inconvenience and expense to both mining companies and to the public. Until rather recently stream pollution has been a mining-community problem. If a water supply was destroyed through mine drainage it was customary to go farther afield for a fresh supply.

Unable to Purify Water Satisfactorily

Attempts have been made and much money spent in the building of treatment plants, which have been unsatisfactory and later have been abandoned. Many communities have had their water systems polluted and have gone farther up stream, at great expense, for fresh supplies. Johnstown, Latrobe and McKeesport have had to abandon their original sources of supply. Barnesboro, Altoona, Connellsville and many other Pennsylvania towns have acid water during certain periods of the year and eventually must seek new sources.

Nearly all the important streams of central and western Pennsylvania which were used twenty years ago for water supply are now seriously contaminated. Pittsburgh, in the center of one of the greatest mining and manufacturing districts of the world, is a particularly glaring example of a city suffering from contaminated waters. As industry expands there is a constantly growing demand for pure water for both domestic and industrial purposes; at the same time the extensive development of coal mines in the vicinity produces more and more mine drainage. During a large part of the year the quantity of water drained from the mines is small compared to the quantity of pure water flowing into the streams above Pittsburgh, and the acid water is so diluted as to render it harmless. This period grows shorter and the period of contamination longer.

The headwaters of some of the streams lie beyond the coal measures, but practically all these areas have been developed and little more fresh water can be obtained from such points. Western Pennsylvania has been developed from the standpoint of mining without regard to future water supplies.

Sulphur Water Strongest in Dry Season

Areas underlaid by coal measures that have been developed and partly or completely mined have little run-off except in wet weather. The broken ground allows easy penetration of surface water, which is later pumped out or drawn from the mine carrying much acid with it. The drought of last summer emphasized the seriousness of the problem in the Pittsburgh district.

The state and individuals have spent much money to solve the problem, but without success. It seems time for wise and careful governmental action. Secretary Hoover suggests a careful investigation of the entire problem before the passage of any legislation whatever, but this must not be deferred too long or there will be litigation between the mining interests and those of the water works.

In the past the interests of the mining industry have been regarded as paramount; but while coal is a necessity, water is necessary for the industrial centers where the coal is used. Both are vital to the welfare and prosperity of the nation.

Mining has maintained its superior position to industry and the water supply of the latter partly through the decision of the Supreme Court in the Sanderson case, in 1886, which gave the Pennsylvania Coal Co. authority to conduct its work without interference by the plaintiff, who obtained his water below the exit of the mine and which maintained that the inconvenience to the plaintiff was not so serious as the closing of the mine would have been. At the same time, however, the Court pointed out that the case "may arise in which such pollution may become a nuisance, and public interest, as involved in the general health and well-being of the community, may require the abatement of the nuisance."

An important case involving stream pollution is now pending in the Court of Equity, Fayette County, Pennsylvania. In this suit the plaintiffs are the Mountain Water Supply Co., the Dunbar Water Supply Co. and the Pennsylvania R.R. About thirty operating coal companies are made the defendants.

The Pennsylvania R.R. about forty years ago gave up its water supply at Portage because of mine-drainage pollution. Several million dollars were spent to provide an adequate supply for the future needs of the company, and Indian Creek basin was developed to supply the southwestern portion of this system. The drainage area of this development is 110 square miles, half of which is underlaid by commercial coal measures, none of which were developed at that time. Since then, however, railroads have tapped this section, mines have been opened and the water supply polluted. This has rendered the situation serious. Careful study has been given to all factors entering into the problem: methods of mining, thickness of seams, drawing of pillars, pitch of the measures, the relation and quantity of water pumped to production of coal, the relation of rainfall to underground water, etc.

Old Mines Produce as Much Acid as New

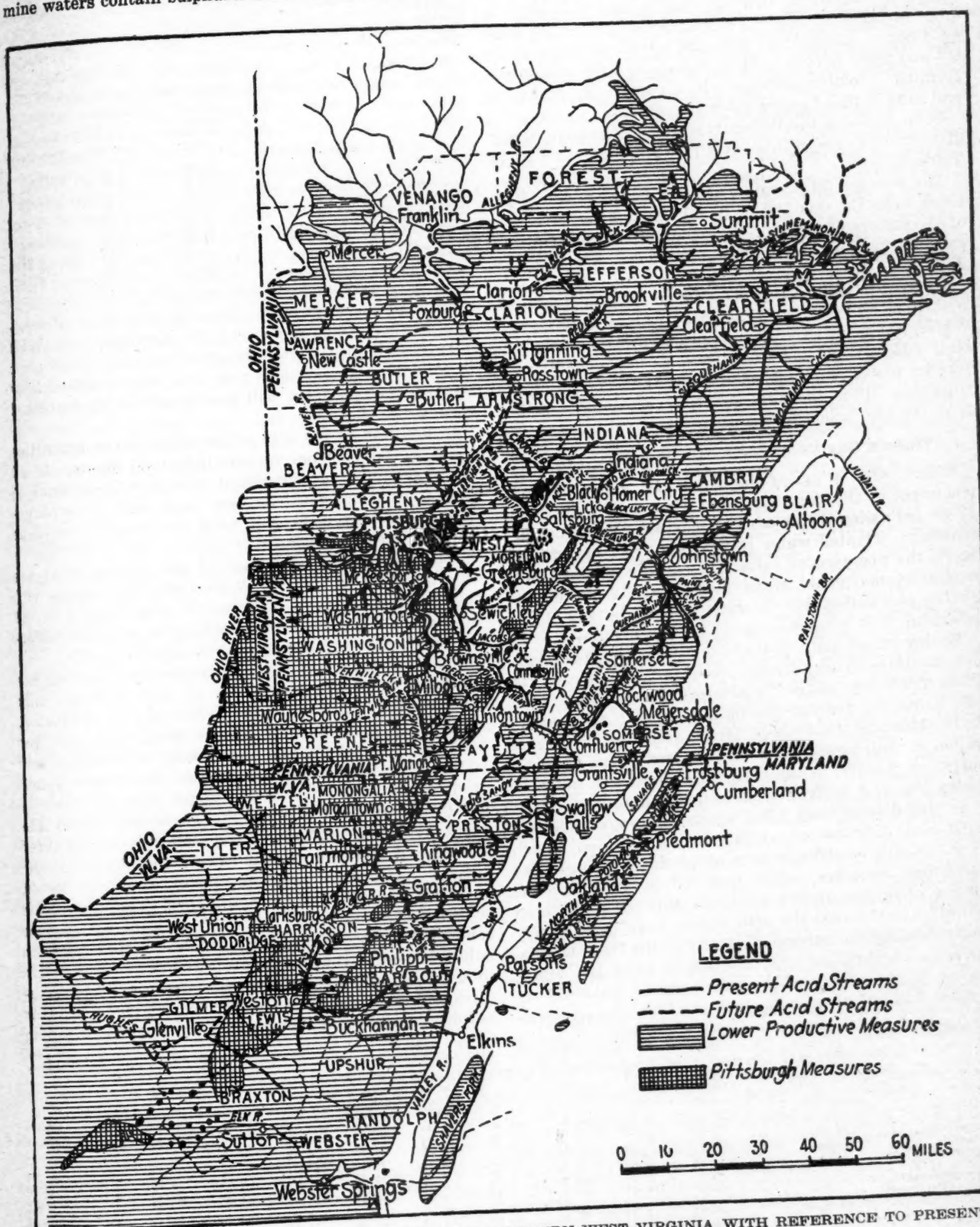
It developed that percolation of water bore no relation to the quantity of coal produced but a direct relation to the extent of development. It depends directly on the extent of the surface that has been disturbed and on the decrease in the run-off owing to the ground thus broken, because for each acre of coal mined much more than an acre of surface becomes disturbed and subject to increased penetration by surface waters.

The records of 170 mines in central Pennsylvania showed that for each acre worked out, 100 to 10,000 gallons of mine water is discharged per day, the average being about 1,100 gallons. In other districts of the state the average was not far from this amount. Shallow workings produced much more than the deeper workings. Many mines produced their maximum only when the pillars were drawn and when, as a result, the surface subsided.

Except in shallow workings, mine drainage flows are quite constant. They do not vary much with rainfall, consequently in time of drought the percentage of acid in the streams is materially increased. In one area, where about half the coal had been removed and where the average depth was about 500 ft. and the rainfall 3,300 gallons per acre per day, it was found that 27 per cent of this water percolated into the mine and was pumped out as acid water. The minimum flow was only 17 per cent less than the average of the year. These

figures are not far from the average percolation in other districts where records have been carefully kept.

The quality of mine drainage is quite as important as the quantity. In practically all the coal mines the mine waters contain sulphuric acid. Of over 300 mines examined in central Pennsylvania in only four was the mine water free from acidity, and in these the absence of acid probably was due to the fact that limestone was in contact with the coal seams. While nearly all seams of coal contain iron pyrites, in the thin seams of central



BITUMINOUS-COAL REGIONS IN PENNSYLVANIA AND NORTHERN WEST VIRGINIA WITH REFERENCE TO PRESENT AND FUTURE STREAM POLLUTION BY MINE WATER

The streams that are already acid are marked in solid lines and those which are expected to become acid with time in broken lines. It will be seen that Mr. Crichton has little hope for any of the streams in the coal area. He paints a gloomy picture of the industrial future and of the social discomfort that will arise from the gradual acidification of the streams.

and western Pennsylvania there is a bone coal carrying a high percentage of sulphur at the top of the main seam, a large portion of which is thrown into the gob, though large quantities are hauled outside and dumped in the valleys. This refuse material, both outside and inside of the mine, oxidizes rapidly and furnishes a large quantity of acid. The sulphuric acid forms salts as it comes into contact with the soluble minerals present and these salts in turn, on exposure, are precipitated, forming insoluble coatings which permit the free acid and salts to flow farther down the stream.

Some mines in the Pittsburgh seam in the Greensburg district of Pennsylvania show free sulphuric acid as in Table II.

The average total acidity at sixty mines of the H. C. Frick Coke Co. was 100 gr. per U. S. gallon. Analyses of the waters of some of the polluted streams in Pennsylvania at much above minimum flows, are given in Table III.

In treating acid water the custom is to neutralize it with lime (converting it into hard water—that is, converting the acid into calcium and magnesium sulphates) then adding soda ash to soften it. The quantity of foreign matter in solution is about the same as before softening. It is the total quantity of sulphates rather than the free acid which governs the treatment.

Twelve Grains of Acid the Working Limit

Water with 4 gr. of sulphates per gallon requires treatment of the same kind, and when pollution exceeds 12 gr. per gallon the amount of soda ash required causes foaming. Treated water is not free from harmful effects, the presence of salts still causing pitting. The human system could stand more than 12 gr. of sulphates per gallon, but a water cannot be said to be healthful if it is contaminated to this extent.

Basing an estimate on the area of coal mined throughout western Pennsylvania, Maryland and West Virginia tributary to the headwaters of the Ohio River and using the average percolation of such mine areas, it is estimated that there is an excess of 5 gr. per gallon of sulphate in the river water which requires softening before using. To this, however, must be added the acid derived from refuse dumps.

In this district over 7,000 square miles are underlaid with coal, only 400 of which have as yet been mined. If the mining of 400 square miles produces water of the foregoing character, what must be in store for the rivers when ten or twenty times this area has been mined? In the past the acid waters have been largely neutralized by the natural alkalinity of the fresh waters, but once the acid exceeds the neutral point the depreciation in the quality of the water will be markedly increased and out of proportion to the area of coal development. The illustration shows the coal fields of western Pennsylvania and parts of Maryland and West Virginia; it also shows the part underlaid with coal; in solid lines the streams now acid and in dotted lines streams that probably will become acid with continued mining.

TABLE II—FREE SULPHURIC ACID IN MINE WATERS FROM PITTSBURGH SEAM

	Grains Per Gallon
Keystone shaft	98.42
Sewickley	61.74
Greensburg Nos. 2 and 3	121.68
Seabord shaft	137.68
Claridge	169.40
Salem	91.20
Crows Nest	123.96

TABLE III—ANALYSES OF POLLUTED STREAMS

	Sulphuric Anhydride SO_2	Sulphuric Anhydride, Acid Sulphate	Free Sulphuric Acid, H_2SO_4
West Branch Susquehanna River at Moss Creek	44.40	5.90	10.60
Quemahoning at Dam	4.20	0.40	0.50
Conemaugh at Portage	35.23	6.80	12.40
Conemaugh at South Fork	24.25	5.40	9.70
Shade Creek at Mouth	4.72	1.00	1.40
Paint Creek at Mouth	37.70	7.40	14.10
Red Stone Creek at Mouth	32.89	6.77	9.33
Jacobs Creek at Mouth	19.49	3.83	8.03
Sewickley Creek at Hunker	40.27	9.80	16.33
Turtle Creek at Wilmerding	48.40	16.33	8.75

In addition to the acid of the mines large quantities enter the rivers from various industrial plants. If all this impurity were neutralized with lime the amount of sludge resulting would be very large and the arrangements necessary to keep it from the streams would be no small item of expense.

With this general statement of the problem what are the suggested remedies? Water-softening plants will help postpone the evil day, but the step from 4 gr. of sulphate to 12 gr., where softening is no longer effective, is short, and other remedies must be sought.

What shall be done with abandoned mines that are constantly throwing quantities of acid drainage into the streams? In time all the pyrite may be exhausted, and the water again may become pure. One case has been reported where the mine ceased to produce acid water after it had been abandoned twenty-five years. It does not appear as if we could wait for time to purify the water. Sealing the abandoned mines has been suggested, but this is impracticable in fractured ground. Where the ground can be thoroughly sealed, keeping out air and keeping the pyrite under water, oxidation will certainly be diminished. This plan holds some hope. It has been suggested that mine drainage be conducted from the mines in non-destructible pipes to points on water courses, below which the water is not used for manufacturing purposes. As a practical proposition this is difficult, because the drainage deposits sediment that would tend to clog any system of piping

TABLE I—TYPICAL ANALYSES OF MINE WATERS, GRAINS PER U. S. GALLON, BY E. C. TRAX

	Miller Shaft	Puritan Shaft	Sonman Shaft	Berwind No. 35	Yellow Run Shaft	Morrellville	Argyle	Blair	Howard	Rogers	Oneida
Total solids	266.01	330.18	276.50	146.42	135.33	608.82	135.88	266.17	218.54	175.53	329.48
Probable incrustants	190.15	247.59	200.67	96.26	75.84	368.13	70.59	85.85	.....	.....	.....
Suspended matter	7.29	9.92	3.21	10.50	8.75	1.20	4.14	.....	.....	.....	.....
Iron oxide	21.56	40.10	29.37	9.22	10.10	128.11	10.27	.....	27.32	28.88	55.19
Aluminum oxide	12.90	6.73	9.14	3.38	4.38	38.21	3.73	.....	5.43	11.45	8.72
Calcium oxide	30.55	27.17	20.90	16.47	9.60	20.76	13.13	7.14	29.47	11.40	27.62
Magnesium oxide	9.05	16.25	12.01	9.77	5.66	15.63	4.79	5.57	12.73	5.49	15.33
Sulphuric anhydride, SO_3	129.40	157.52	130.84	72.74	57.50	295.64	70.93	141.89	85.79	55.17	111.95
Sulphuric anhydride (acid sulfate)	20.82	37.33	37.68	10.04	11.67	87.06	21.88	16.47	.....	.....	.....
Free sulphuric acid, H_2SO_4	34.42	61.25	45.50	23.62	28.00	247.06	26.47	115.00	25.04	41.53	50.31
Chlorine	0.70	0.82	0.58	0.47	0.76	2.27	2.70	0.29	.....	.....	.....
	Treatment Required, Pounds per 1,000 Gal.										
Lime	7.30	13.06	10.79	5.31	5.00	34.95	5.80	.....	.....	.....	.....
Soda ash	19.52	29.20	23.78	13.01	11.01	68.90	14.18	.....	.....	.....	.....

that could be used. An open drainage or a concrete duct would offer a better medium than any piping.

In the West barium has been used quite successfully to soften water, but its cost is excessive and water so treated is not suitable for domestic purposes. Evaporation is the only really satisfactory method of converting contaminated waters into something that can be used, but the cost is prohibitive.

The building of large storage reservoirs for impounding fresh water for the purpose of dilution has been proposed, but this would be expensive and of only temporary benefit. In the past the problem has been solved by going farther up stream to unpolluted sources, but in many instances no such sources are now available. The water companies have asked that coal mining cease in certain areas, and this the courts still have under advisement. It is certain that coal-mine development cannot be carried on without destroying the water of the immediate vicinity. It would, therefore, seem that about the only means of conserving the water supply is to stop coal mining in those little-developed areas which still contain an ample supply of fresh water. This cannot well be done as between individuals.

The State Board of Health in Pennsylvania reports ninety-six water companies with acid-pollution problems. This problem is connected and might well be considered with the matter of the overdevelopment of the coal industry. The coal industry is not to blame for this condition; it is simply a development of that industry. The public must either suffer the inconvenience or meet the cost of combating it.

We cannot learn from Europe how this problem may be handled because on that continent the coal mines do not have a similar problem. In Great Britain many of the mines use their water for boiler purposes and without treatment. In Yorkshire mine drainage is used as a source of domestic supply. In Great Britain the mines are being worked at depths varying from 1,000 to 4,000 ft. and they have relatively little water; in some of them water must be taken underground in order to lay dust. British coal mines are not acid producing because the coal is low in sulphur and often is in contact with limestone. In France the mines do not produce acid water, probably because an overlying bed of chalk extends from the surface to a depth of 300 ft.

With less than one-tenth of the coal of western Pennsylvania worked out, with continued mining, as at present conducted, and new development constantly being started, it is apparent what the results to the streams will be in a comparatively short time. The mine-drainage steam-pollution problem is serious. Its extent is not fully realized by the industry or the public. Secretary Hoover's suggestion that the question be carefully investigated in order to determine possible remedies and legislative enactment is wise and should be heartily approved and receive the co-operation of the coal industry.

Compare Coal Analyses of 25 Laboratories*

BY A. C. FIELDNER,† H. M. COOPER‡ AND F. D. OSGOOD§

A STUDY of results obtained in analyzing similar samples of coal and coke by twenty-five laboratories throughout the country was recently conducted by the U. S. Bureau of Mines in comparison with results obtained in the bureau's coal laboratory at Pittsburgh, the purpose of this work being primarily to obtain a comparison of the methods of coal analysis used by the laboratories of the American Gas Association. Therefore, four standard samples of coal and one of coke were prepared in the Bureau of Mines coal laboratory at Pittsburgh, and portions were sent to each laboratory. At the same time, a like number of standard samples were submitted to twelve commercial laboratories not affiliated with the association, for the purpose of comparing their analyses with the results obtained by the U. S. Bureau of Mines and the American Gas Association. The comparison is based on the average of twenty-four analyses by the Bureau of Mines on each kind of coal, and the accompanying curves show the deviation from this average analysis, together with deviations from the check limits of the American Society for Testing Materials.

The laboratories co-operating in this standardization work are as follows:

AMERICAN GAS ASSOCIATION LABORATORIES

The Barrett Co., New York.
Boston Consolidated Gas Co., Boston, Mass.
Brooklyn Union Gas Co., Brooklyn, N. Y.
Camden Coke Co., Camden, N. J.
Chemical Service Laboratories, West Conshohocken, Pa.
Consolidated Gas Co. of New York, New York.
Henry L. Doherty & Co., New York.
Koppers Co. Laboratories, Pittsburgh, Pa.
Milwaukee Gas Light Co., Milwaukee, Wisconsin.
New England Fuel & Transportation Co., Boston, Mass.
Peoples Gas Light & Coke Co., Chicago, Ill.
Charles H. Tenney & Co., Boston, Mass.
United Gas Improvement Co., Philadelphia, Pa.

COMMERCIAL LABORATORIES NOT AFFILIATED WITH AMERICAN GAS ASSOCIATION

Perry Barker, Boston, Mass.
Commercial Testing & Engr. Co., Chicago, Ill.
Consolidation Coal Co., Fairmont, W. Va.
D. J. Demorest, Ohio State University, Columbus, Ohio.
O. L. Kowalke, University of Wisconsin, Madison, Wisconsin.
Arthur D. Little Company, Boston, Mass.
S. W. Parr, University of Illinois, Urbana, Ill.
Pittsburgh Testing Laboratory, Pittsburgh, Pa.
H. C. Porter, Philadelphia, Pa.
Public Service Electric Co., Newark, N. J.
U. S. Testing Co., New York City.
Warner Laboratories, Cresson, Pa.

The samples were carefully prepared by H. M. Cooper, chemist in charge of the Bureau of Mines coal laboratory at Pittsburgh, assisted by F. D. Osgood and W. H. Miller. The series consisted of twenty-four bottle samples each of an anthracite coal, a byproduct coke, a semi-bituminous Pocahontas coal, a low-sulphur low-ash Elkhorn Kentucky coal and a high-sulphur high-ash

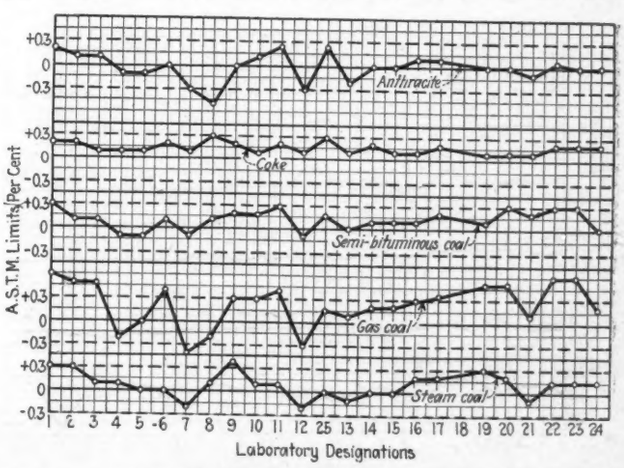


FIG. 1—DEVIATIONS FROM BUREAU OF MINES RESULTS, MOISTURE, AS RECEIVED

*Report submitted by A. C. Fieldner, chairman of Subcommittee on Analysis of Coal and Coke, American Gas Association, published in the *American Gas Association Monthly*, January, 1923.

†Superintendent, Pittsburgh experiment station, U. S. Bureau of Mines. ‡Chemist, U. S. Bureau of Mines. §Assistant chemist, U. S. Bureau of Mines.

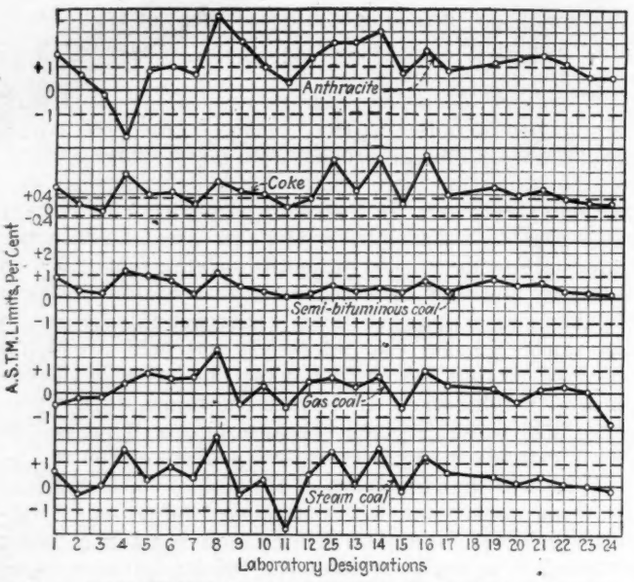


FIG. 2—DEVIATIONS FROM BUREAU OF MINES RESULTS. VOLATILE MATTER, AS RECEIVED

Pennsylvania steam coal. Laboratory No. 8 split its samples into equal parts, giving one part to laboratory No. 25 and retaining the other part.

In order that the samples would be as nearly representative as possible, the gross sample of approximately 10 lb. was thoroughly air-dried, then ground in the ball mill and passed through a 60-mesh standard sieve, after which it was mixed on a rubber cloth and quartered in the usual manner. Approximately an aliquot portion was taken from each quarter for each bottle sample.

Each bottle sample was then analyzed separately by the Bureau of Mines and transmitted to the various laboratories for analysis. The Gas Association laboratories were advised that care should be taken in determining the B.t.u. and ash content of the anthracite and coke samples on account of the tendency of incomplete combustion. They were also advised that if comparable results were to be obtained, the American Society for Testing Materials methods must be strictly followed in determining the volatile matter. These methods, as published in the *Gas Chemists' Handbook*, were not used in all the laboratories, however.

Curves showing the moisture variations are presented in Fig. 1. As a whole, the moisture determinations on the samples show good work on the part of the chemists, only 13 out of 120 determinations being outside of the check limits, and 10 of these are on the gas coal. Apparently considerable trouble was experienced with gas coal, where only 19 of the 24 laboratories are above the zero line, and 4 below and 1 checking.

Noting this tendency, the moisture was redetermined by the Bureau of Mines chemists on five additional samples of each class of coals and coke, which were held in reserve. There was no indication from these results obtained that the moisture content had changed after standing for two months. The general tendency of all determinations was to be above zero line, 85 being above, 19 below, and 16 an absolute check. The common copper drying oven and majority of electric ovens are not adapted for this determination, owing to irregular temperature and lack of proper air circulation.

Curves showing variations in the volatile-matter determinations are presented in Fig. 2. A great improvement is shown in the volatile-matter determination over the results shown in previous co-operative work. As was expected, the results on the anthracite and semi-bituminous coals and the coke sample fall above the zero line, with the exception of three determinations. The gas and steam coals are found to be on both sides of the line, 35 being above and 13 below.

Out of a total of 120 determinations, 40 do not check;

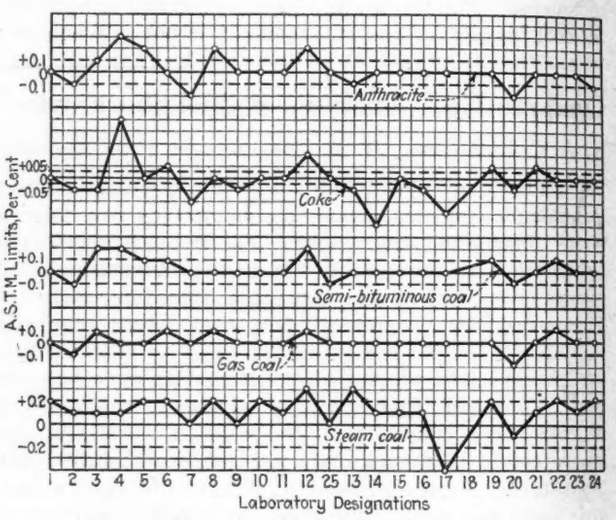


FIG. 4—DEVIATIONS FROM BUREAU OF MINES RESULTS. SULPHUR, AS RECEIVED

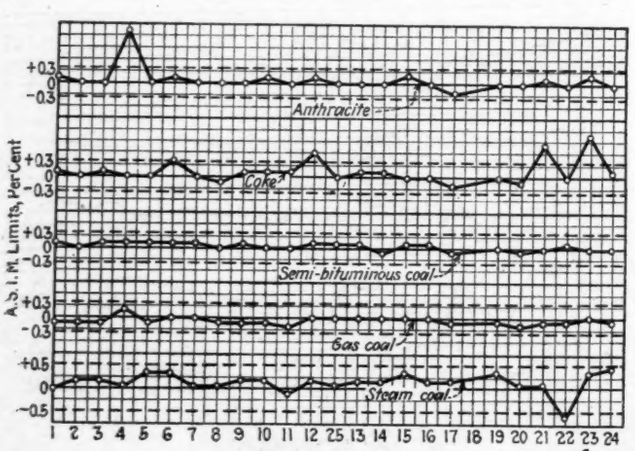


FIG. 3—DEVIATIONS FROM BUREAU OF MINES RESULTS, ASH, AS RECEIVED

37 of the latter are above the limit line, and 26 of the 37 are on the anthracite and coke, which is conclusive proof that greater care is required on low-volatile materials such as anthracite and coke.

Laboratories 2, 9, and 25 reported the preheating of the sample at 105 deg. C. before making the determination of volatile matter and laboratory 21 reported the use of 20 drops of alcohol in making this determination on the coke sample. On studying the results of these laboratories it is found that this procedure did not give them any more consistent results, and past experience has not shown such modifications to be necessary. The results showing the greatest variation can be traced to the use of large crucibles with flat or loose-fitting covers.

Curves showing ash variation are presented in Fig. 3. The ash determinations show exceptionally good work on the part of the chemists, as only 5 out of 120 determinations are outside of the checking limits. Three of these results are on the coke, one on the

anthracite, and the fifth on the steam coal. The first four probably are due to incomplete combustion, as the results are very high, and the other was ashed at a temperature of 1,000 to 1,050 deg. C., which result is low.

Curves showing sulphur variations are presented in Fig. 4. With the chemical knowledge available on sulphur one would naturally expect closer agreement of the results than is indicated by the curves, but out of the total of 120 results, 27 are outside of the checking limits. Sulphur from gas burners probably is responsible for some of the high results.

Should the checking limits on coke be increased from 0.05 to 0.1 per cent, nine of the results that fall outside of the limits would then be within the A.S.T.M. limits.

Curves showing the variations in the B.t.u. determination are presented in Fig. 5. The results obtained on the determination of heating value are very satisfactory. Much closer results were obtained on the whole series than in the previous series; 38 determinations out of 110 do not check, of which 12 are on coke, and the remainder about evenly divided between the other four classes. The widest variations are due to nickel-lined bombs and incomplete combustion, especially in the anthracite and coke samples. Evidently the warning, calling to the attention of each of the gas Association laboratories the difficulties that might be expected with these samples were not observed by some of the chemists.

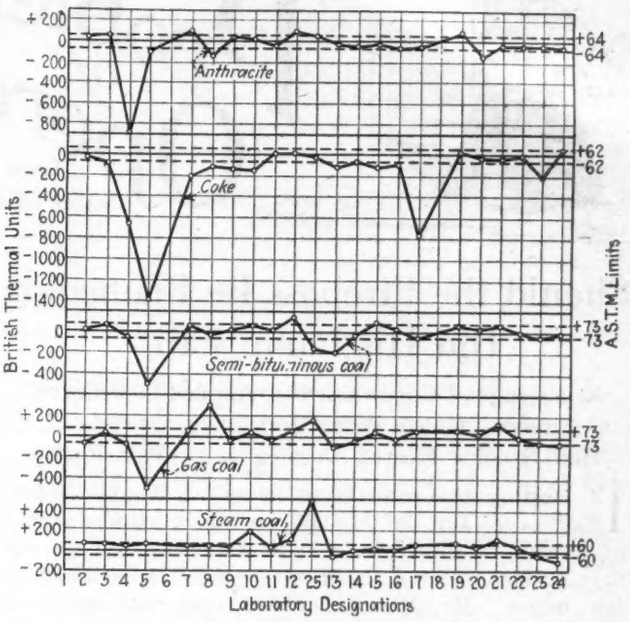


FIG. 5—DEVIATIONS FROM BUREAU OF MINES RESULTS. BRITISH THERMAL UNITS

Standardization Factors Must Be Correct

It is noted that some of the laboratories failed to make the proper corrections for acidity, sulphur, thermometer, etc. The operator can only hope to obtain the best results when these corrections are correctly applied and his standardization factors are absolutely correct. Nickel linings have no place in calorimetry and if reliable information is expected they must be discarded.

The results obtained indicate a closer application of the A.S.T.M. methods outlined in the *Gas Chemists' Handbook* than in previous comparisons. It is essential that all of the laboratories of the Gas Association as well as other coal laboratories use the standard methods in their coal work to insure accurate analysis of the fuel. Attention is called to the following points:

(1) Dry air must be circulated through the moisture oven at a sufficient rate to change the volume of the oven three to four times per minute.

(2) The best results are obtained for the determination of volatile matter when a 10-c.c. capsule-type crucible with a well-fitting cover is used. The electric furnace is superior to the Meeker burner for consistent work.

(3) The use of open burners is likely to give high results with manufactured gas in the sulphur determination. Sulphur determined from bomb washing will invariably run low, varying in proportion to the amount of sulphur present.

(4) More attention should be given to the proper application of corrections for acidity, radiation and sulphur in the calorimeter determination. The calorimeter bomb should have an inner surface of platinum, gold, porcelain enamel or other material not attacked by nitric or sulphuric acids or other products of combustion.

Nickel linings should not be used if results checking within A.S.T.M. limits are desired.

LABORATORY METHODS USED

		Moisture		Volatile Matter					Ash		Sulphur		Calorimeter	
				Furnaces Temp., Deg. C.			Platinum Crucible							
Laboratory	Standard Method	Air Was Dried	Times Rewnewed (Or Volume Passed) Per Minute	Meeker Burner	Electric Muffle	Vertical Electric Tube	Capacity (c.c.)	Type of Cover	Temp., Deg. C.	Eschka	Bomb Washing	Peroxide	Type of Bomb	Lining
1	X	X	2	X-950	.....	.....	20	Flat	750	..	..	X	.....	.....
2	X	X	2 to 3	X-950	.....	.....	10	Flat	(c)	X	..	..	Parr	Illium
3	No	No	2 cu.ft.	.....	.....	X-940	(d)	Capsule	750	..	..	X	Parr	Illium
4	X	..	..	X-950	.....	.....	..	Flat	.....	X (a)	..	..	Emerson	Nickel
5	No	No	..	950	.....	.....	10	Capsule	890*	X (a)	..	..	Emerson	Nickel
6	No	X	1	.....	.....	X-950	10	Capsule	750	X	..	..	.....	.....
7	No	X	1-2 cu.ft.	.....	X-950	.....	10	Capsule	750	X	..	..	Emerson	Nickel
8	X	X	2	.....	.....	X-950	20	Flat	750	X	..	..	Emerson	Gold (b)
9	X	X	1 liter	.....	X-950	.....	(f)	Porc.	750	X	..	..	Parr	Illium
10	No	No	None	.....	X-750	.....	10	Capsule	750	..	..	X	Emerson	Nickel
11	No	No	(c)	X-950	.....	.....	(e)	Capsule	750	..	..	X	Parr	Illium
12	X	X	2 to 4	.....	.....	X-950	10	Capsule	750	..	..	X	Parr	Illium
13	No	No	..	X-950	.....	.....	25	Capsule	950	..	..	X	Parr	Elec. (b)
14	...	...	..	.....	.....	(No	report)	.....	.....	...	..	..	.....	.....
15	No	...	..	X-950	.....	.....	15	Capsule	800	X	..	..	Emerson	Gold
16	X	X	1½	X-1,000	.....	.....	.....	.....	915	X	..	..	Parr	Illium
17	No	...	..	.....	.....	X-950	20	Capsule	700	..	X	..	Parr	Illium
18	...	...	..	.....	.....	(No	report)	.....	.....	...	..	..	.....	.....
19	X	X	2½	X-965	.....	.....	10	Capsule	800	X	..	..	Emerson	Gold
20	X	X	3	X-950	.....	.....	10	Capsule	750	..	X	..	Parr	Illium (b)
21	...	No	..	X-970	.....	.....	16	Capsule	775	X	..	..	Emerson	Nickel
22	No	X	1	X-950	.....	.....	10	Capsule	1,000	..	..	X	Parr	Illium (b)
23	X	X	2 to 3	.....	X-950	.....	10	Capsule	765	..	X	..	Parr	Illium (b)
24	No	...	..	.....	.....	X-950	10	Capsule	750	X	..	..	Emerson	Platinum
25	No	No	3	X-940	.....	.....	15	Flat	940	X	..	..	Emerson	Nickel

X = Standard methods. * 4 Meeker burner muffle; glazed SiO_2 capsule. (a) Burned off over gas burners. (b) Adiabatic calorimeter outfit. (c) Not measured. (d) Illium, 11 c.c. (e) Illium, 10 c.c. (f) Porcelain, 10 c.c.

Problems of Operating Men

Edited by James T. Beard

Should the Fireboss Be Blamed or Did His Lamp Fail?

Knowledge of Conditions Not Applied in Practice —Fireboss Killed When Removing Gas—Lamp Had Become Heated Causing It to Pass Flame

IN reading the interesting letter of W. H. Moore, *Coal Age*, Jan. 25, p. 184, we are reminded again of human fallibility, in respect to safety-first on the part of men holding the most responsible positions in coal mines. Mr. Moore, however, does not appear to blame his fireboss, but attributes the accident to the failure of the bonneted Wolf double-gauze lamp the fireboss carried.

The letter gives the account of the Wakesiah explosion that cost the lives of the fireboss and a pumpman. The extent to which the writer of the letter blames the dead fireboss is found in the words with which he prefaces his remarks. He states: "Notwithstanding all knowledge of the principles and conditions affecting the use of safety lamps in practice, . . . that a safety lamp is not safe under all conditions."

Bureau of Mines Investigated Safety Lamps

Attributing the cause to the failure of the lamp, Mr. Moore closes his letter with an appeal for further investigation of the action of safety lamps in explosive mixtures. He seems to forget or, perhaps, he has never seen the bulletin issued by the Federal Bureau of Mines, giving in great detail the series of experiments performed by the bureau on safety lamps under all conditions. These experiments were the most recent ones then performed under true mine conditions and have since been supplemented by the experiments of Prof. H. B. Wheeler, in England. What more, then, is to be done than to follow out in practice the lines laid down by these experimenters?

It is unnecessary to rehearse the account of this sad occurrence at the Wakesiah mine, which Mr. Moore has given in full detail in his letter. From the account given by him as manager of the mine, it appears that the lamp carried by the fireboss was found to be properly assembled and in perfect condition, following the explosion in the mine.

Lamp Failed Because of Overheating

However, the later examination of the interior of the gauzes showed that they had been exposed to intense heat, which was not apparent on the outside of the gauze. The conclusion seemed inevitable that the lamp had been used for illuminating purposes too long and had become heated, which caused the flame to pass through the gauze and ignite the gas outside of the lamp.

One of the lessons to be learned from this account is the need of applying what knowledge we have regarding the action and use of safety lamps, in our daily practice in the mine, and shelve for a time the possibility of a bonneted double-gauze Wolf safety lamp failing when properly used.

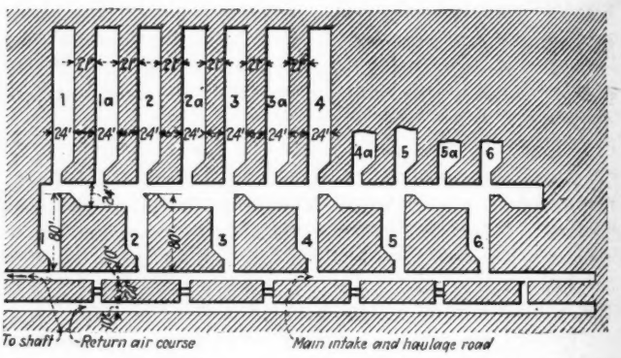
James Ashworth,
St. Augustine, Fla. Consulting Engineer.

Modified Double-Room Method

Plan suited to avert possible squeeze—Rooms driven on 90-ft. centers connected at face by cross-rooms—Intermediate rooms turned off cross-rooms—Advantage of the system.

REFERRING to the inquiry of Robert Holt, *Coal Age*, Feb. 1, p. 226, who asks for an expression of opinion as to whether there will be less liability to development of squeeze if the drawing back of the pillars, in a panel of thirty rooms, be delayed until the panel is complete when all the pillars can be drawn back together. Or, would it be better to draw back each pillar as the rooms reached the limit?

Judging from the information given and in the light of my own experience in working the Miller seam,



METHOD PROPOSED TO AVOID DANGER OF SQUEEZE

unless the rooms are driven quite narrow and wide pillars are left for the support of the roof, there is strong probability that a squeeze will result from the extraction of the coal in the rooms. The pillars will be crushed so that a comparatively small percentage of pillar coal can be recovered with safety.

Under this depth of cover, 250 ft., and with the conditions that prevail characteristically in the Miller seam, I would recommend trying the system of driving the first rooms turned off the entry on 90-ft. centers and connecting these by cross-rooms turned at a distance of 90 ft. from the entry and driven parallel thereto as indicated in my sketch. Other rooms are then turned off these cross-rooms, midway between the first set of rooms.

There is thus formed a system of advancing rooms, each 24 ft. wide with 21-pillars between them, as shown in the figure. The first rooms, turned on 90-ft. centers, are numbered 1, 2, 3, etc., while the intermediate rooms turned off the cross-rooms are numbered 1 *a*, 2 *a*, 3 *a*,

etc. This arrangement affords solid blocks of coal, approximately 80 ft. square, as entry stumps, which amply protect the entry and permit the drawing back of pillars, as quickly as each block of rooms is finished.

In the figure, I have shown rooms driven up in blocks of seven rooms, each. Care must be taken, however, to work a sufficient number of rooms in a block to give an area large enough to allow the roof to break readily. The breakline should be kept as straight as possible to avoid undue crushing on any of the pillars.

After the miners and their helpers have become familiar with this system, they will begin to appreciate its advantages. The work is easily handled; there is little danger of squeeze or creep occurring and a minimum of rock to handle by reason of that fact. The system will be found to guarantee a maximum recovery of coal. The expense for yardage is also reduced to a minimum. FRANK PARDOE.

Washington, Pa.

Certain Details in Humidifying

Shaft bottom and portion of main haulage road must not be neglected—Radiator system expensive to install and maintain—Direct method of applying steam better.

THE question of humidifying a mine ventilated on the exhaust system has proved an interesting one to the readers of *Coal Age*, judging from the references made to the manner of overcoming the annoyance of introducing steam into the intake which is also the haulage road in the exhaust system of ventilation. These references appeared in the issues of Dec. 21, p. 1000 and Dec. 28, p. 1043.

There are a few points, however, bearing on these methods of humidifying the mine air to which attention may well be called. In the first place, the plan of introducing the steam into the intake at a point a considerable distance inby leaves the shaft bottom and a portion of the main haulage road dry and dusty, and they receive no benefit from the steam introduced at the point beyond.

In this regard, let me say that this portion of the mine should not be neglected. I would suggest that a branch pipe be laid through the crosscut at the shaft bottom by which a portion of the steam can be conducted into the haulage road at that point, every night when the presence of the steam would not be as objectionable as during the day when the mine is running.

Dampening at Intervals Injurious to Roof

This should be done every night without exception and not at more or less frequent intervals when it is thought the place needs to be dampened. Nothing is more injurious to a slate roof than a constant change from a dry to a wet condition, which would result if the operation was only performed at intervals. The same injurious effect will be produced on the timbers, causing their more rapid decay.

Speaking of warming the air by the use of radiators, this plan may prove efficient when the air volume is small. The use of radiators to heat large volumes of air entering the mine will prove both expensive and cumbersome. The action of the steam on the air through the radiator walls is too slow and better results are obtained by direct contact as when the steam is blown into the air through an expanding nozzle.

My experience proves that blowing the steam into the air by a nozzle pointing in the direction in which the current is moving accomplishes the double object of warming and humidifying the air in one process and the air is cleared in less than one half the distance required by the use of radiators and bafflers or curtains.

It is important that the nozzle should be tapered outward properly to produce the best results by expanding the steam to the atmospheric pressure as it issues from the nozzle. A better distribution of the steam in the air is thus obtained.

Cost of Radiator System Excessive

Such a nozzle is easily made and at little expense. It only needs to be screwed into the end of the pipe line when needed to be used. At other times, it should be put away in a dry place where it can be found when needed again.

On the other hand, the first cost of a radiator system far exceeds that of a nozzle. Moreover, unless the radiators and pipes are taken apart on the approach of the summer season and stored away in a dry place, they will be in no condition for use the following winter. Even the use of galvanized pipes gives little better results, as corrosion eats away the metal where the pipes are threaded. Iron pipes last a little longer than steel. Brass, of course, is better but too expensive.

Where live steam is used, the automatic regulation of the flow of steam from the pipe line, by means of a thermostat, will be found a great money saver, as live steam is expensive. In winter, it is nothing unusual for the temperature of the air to vary from 20 deg. or lower during the night to 40 or 50 deg. at midday. It is clear that much less steam is required to saturate the air at times under these changes of temperature. MINING ENGINEER.

———, W. Va.

Sealing Abandoned Areas Safest Practice

Arguments for and against sealing off abandoned areas—Conditions must determine question of sealing—Need of constructive suggestions—How seals should be built.

RECENT disastrous explosions have focused much attention on the hazards of the mining game. It would add greatly to the peace of mind and future happiness of those whose lot is to toil underground, if a satisfactory plan could be worked out to guard against the menace of gas in mines.

During the past few months, writers of *Coal Age* have dwelt much on this subject. Strong arguments have been offered to show that worked-out areas should never be sealed, but should be ventilated in a manner that will keep them free from dangerous accumulations of gas. On the other hand, many have argued in favor of sealing off such areas.

Sealing Abandoned Places Safest Practice

The subject of sealing abandoned places is an important one in the mining of coal. It is worthy of serious and broadminded consideration. Doubtless one's experience will largely modify his views. My own, in mines generating large quantities of gas, has led me to favor the sealing off of abandoned areas as being the safest practice.

However, I frankly admit that the question must be determined very largely by the general conditions exist-

ing underground, particularly the nature of the roof and floor of the seam. These conditions will often forecast the probability of the occurrence of squeeze, which has an important bearing on the matter of sealing.

Even so, it hardly seems commendable to leave extensive areas open for the free circulation of air, when a shorter and more direct route can be had by sealing off such places. The question has been discussed at length by other writers and little can be said, except what would be mere repetition and help not a whit in deciding the matter.

We need suggestions that are constructive and have regard to the best methods of building the seals, should this be decided on as necessary. While I know many will prefer to ventilate areas that have been worked out and are standing, my own conviction is that such territories should be sealed.

Essential Points in Building of Seals

Assuming then that seals are to be built, allow me to suggest a few essential points in their construction. First, it is absolutely imperative that solid bottom be found before the wall is started. Cracks in the bottom must be dug out, until solid formation is reached. I have known instances where the ditch had to be dug 8 or 10-ft. deep.

Hitches must then be cut 2 ft. into the solid rib coal and the equally solid roof above. These cuts should be started at a width of 2½ ft. and offset at the back of the cut, say 8 in. deep, the offset having a width equal to two cement blocks. This manner of cutting into the rib allows the builder ready access to the corners, where the greatest care must be exercised to see that every crevice is filled.

The ditch in the floor is filled with a good cement concrete, fluid enough to flow into every nook and crevice. Time is given for the concrete to set well before starting the wall, which is built up of a double thickness of concrete blocks, carefully laid in cement and tightly sealed along each rib and at the roof. A 2-in. pipe with a screw-cap must be built into the wall near the top of the seal, as a means of enabling the testing of the condition of the gas-charged air behind the seal.

Well Built Seals to Be Constantly Watched

After the seal has been completed, it must be watched, from day to day, to observe whether any settlement has taken place. If cracks develop these must be carefully plastered. In one instance that I recall, a gob fire had started in an accumulation of fine coal and slack piled with some timber near a gas wall that sealed an opening.

This wall was 40 ft. from the airway and leaking gas. The latter would accumulate and every few minutes flame would shoot across the entry in an alarming manner. This continued and, at intervals, there was heard a resounding zoom, as one explosion followed another. It is easy to imagine the feelings of those who had to contend with this danger and to realize that the situation had to be handled with much care.

In the building of seals in the manner described, ordinarily little trouble was experienced during the first year. However, owing to subsidence or squeeze occurring inside the wall, the utmost vigilance was required the second year, as the accumulated gases would be forced through the seals under high pressure. Then, let me say, woe betide that community should someone in charge sleep at the switch.

May I add, in closing, that none but thoroughly experienced and trustworthy men should be charged with the examination of a mine, each morning—examiners who will put the lives of others ahead of their own. We must remember that the night may bring to the home the blackened remains of a husband, father or brother who went out in the morning happy in the thought that he could provide the necessaries of life for those depending on him. Such a thought should suffice to stimulate every man to the greatest vigilance in the desire to avert disaster and lower the accident rate in our mines, which has been growing.

Panama, Ill. ALEXANDER BENNETT.

Inquiries Of General Interest

Flow of Water in Pipes

Explaining formula for calculating the flow of water in a given pipe, under a given head. Three factors determine total head producing the flow.

Having occasion, recently, to refer to my old friend, *Trautwine's Handbook for Engineers*, in search of a formula for calculating the amount of water that will flow through a given pipe, in a certain time and under a given head, I was puzzled to understand the formula given, which read as follows:

$$h = \frac{fl}{d} \times \frac{v^2}{2g} + \frac{1.5v^2}{2g}$$

Kindly explain this formula and say why the first two terms are multiplied together instead of being added, as is the last term and as it seems to me they should be. Also, show the same formula expressed in terms of the diameter (d) of the pipe; and the flow of water (G) in gallons per minute. STUDENT.

Windsor, Pa.

The formula given is either wrong or copied wrongly. The first sign in the second number should be a plus sign like the last. The three terms should express, respectively, the friction head, velocity head and entrance head. But the entrance head, due to the water entering is always assumed to be one-half the velocity head, which would make the coefficient of the last term 0.5, instead of 1.5 as given above.

The corrected formula expressed in terms of d and G, asked by the correspondent, assuming a coefficient of friction for mining practice $f = 0.01$, is as follows:

$$h = \frac{lG^2}{800d^5} + 0.0026\,\frac{G^2}{d^4} + 0.0013\,\frac{G^2}{d^4}$$

$$= \frac{G^2}{d^4}\left(\frac{l + 3.12d}{800d}\right)$$

Or, solving for G, gives for the flow of water in gallons per minute, under the head h,

$$G = d^2\sqrt{\frac{800dh}{l + 3.12d}}$$

When the diameter of the pipe in inches is less than its length in hundreds of feet the second term in the denominator can be dropped with only slight error.

Examination Questions Answered

Miscellaneous Mine Examination Questions

(Answered by Request)

QUESTION—*In a mine subject to sudden outbursts of gas, what precautions would you take to prevent loss of life? What warnings usually precede outbursts of gas?*

ANSWER—When working a seam of coal subject to outbursts of gas, it is well to drive the places narrow, in the first winning, and give plenty of time for the gas to drain off before drawing back the pillars. Another precaution that may assist in relieving the situation is to drill numerous holes into the ribs and faces of the coal for the purpose of draining the gas on that portion of the seam. Where the cover is not too great, large boreholes can be sunk from the surface, at points in advance of the working faces in the mine.

Outbursts of gas are often preceded by ominous sounds that the miners call "bumps." These sounds are caused by the settlement and readjustment of the strata, resulting from the working of the gas toward the opening driven in the seam.

QUESTION—*In a mine the quantity of air measured in the return is 165,000 cu.ft. per min. (a) The return current contains 3 per cent of firedamp (marsh gas), what quantity of gas is given off in this mine? (b) What is the least decrease in the quantity of air that will render the return air explosive? (c) What increase of gas will (likewise) render the return air explosive?*

ANSWER—(a) The volume of gas in the return current is $0.03 \times 165{,}000 = 4{,}950$ cu.ft. per min.

(b) Assuming the lower explosive point of this gas is reached when the proportion of gas to air is 1 : 13, the quantity of air in circulation to produce that condition would be $13 \times 4{,}950 = 64{,}350$ cu.ft. of air. Then, the volume of air entering the mine is 165,000 — 4,950 = 160,050 cu.ft. per min. In order to reach the lower explosive limit of the gas, this volume must be decreased 160,050 — 64,350 = 95,700 cu.ft. per min.

(c) In order to produce the same condition by an increase of gas, the volume of gas generated must be $160{,}050 \div 13 = 12{,}311$ cu.ft. per min. This would call for an increase of 12,311 — 4,950 = 7,361 cu.ft. per min.

QUESTION—*What is the weight of 250 cu.ft. of marsh gas, barometer 30 in., temperature 65 deg. F.?*

ANSWER—Taking the specific gravity of marsh gas as 0.559, referred to air the same temperature and pressure, the weight of 1 cu.ft. of marsh gas, at a given temperature and pressure is

$$0.559 \frac{1{,}3273 \times 30}{460 + 65} = 0.0424 \text{ lb.}$$

The weight of 250 cu.ft. of this gas would then be $250 \times 0.0424 = 10.6$ lb.

QUESTION—*Explain the action of the Burrell gas detector.*

ANSWER—This instrument consists of a small brass tube connected at the bottom with a gage glass. At the top of the brass tube is arranged the combustion space containing a wire bridge that can be made incandescent by the current from a small electric battery. In use, water fills both the brass tube and the glass gage up to the level of the zero of the scale. By blowing gently into the rubber tube attached to the top of the glass gage, the water in the gage is depressed and rises to fill the combustion space at the top of the brass tube and is held at that level by pinching the rubber tube. The instrument is now raised to the point where a test is to be made for gas. Releasing the rubber tube draws the gas into the combustion space as the water level in that tube falls. The valve through which the air enters is now closed and the electric current turned on for a minute and a half, in which time all the gas that may be present in the air is consumed. The instrument is then shaken to cool the air remaining in the tube, after which its volume is measured on the graduated scale, which is calibrated to show the percentage of gas present.

QUESTION—*If the quantity of air passing into a mine is 75,000 cu.ft. per min., at a temperature of 50 deg. F. and the quantity measured in the return is 82,000 cu.ft. per min., at a temperature of 75 deg. F., what quantity of the increase is due to expansion from the increase in temperature and what quantity is due to the gases given off in the mine, neglecting barometric conditions?*

ANSWER—Disregarding any change in barometric pressure, the volume of air varies as the absolute temperature. Then, calling the increase volume due to the rise in temperature from 50 deg. to 75 deg. F., we have

$$75{,}000 \frac{460 + 75}{460 + 50} = \frac{75{,}000 \times 535}{510} = 78.676 \text{ cu.ft.}$$

The increase due to expansion is, therefore, 78,676 — 75,000 = 3,676 cu.ft.

Finally, the total increase as measured in the return being 82,000 — 75,000 = 7,000 cu.ft., the increase due to the gases given off in the mine is 7,000 — 3,676 = 3,324 cu.ft.

QUESTION—*Is it possible to have an explosion in a mine where the safety lamp gives no indication of firedamp?*

ANSWER—Yes. A mine generating much fine dust, particularly if the coal is highly inflammable, is liable to an explosion occurring by the ignition of the dust suspended in the air current and exposed to the flame of a blownout shot or any flame of sufficient volume of intensity. Although it is not necessary that any gas should be present, the explosion is more liable to occur if a small percentage of gas is present that gives no indication on the flame of a safety lamp. Under these conditions, every precaution should be taken to avoid the accumulation of fine dust at the working face and on the roads and traveling ways, and every means should be used to prevent the suspension of the dust in the mine air.

QUESTION—*In an air current 6 x 8 ft., in sections, and 5,500 ft. long, what is the velocity of the air current when the water gage stands at 2 inches?*

ANSWER—The sectional area and rubbing surface of this airway are respectively, $a = 6 \times 8 = 48$ sq.ft.; $s = 2(6 + 8)5{,}500 = 154{,}000$ sq.ft. The pressure due to a 2 in. water gage is $2 \times 5.2 = 10.4$ lb. per sq.ft.

Finally, substituting the given values in the formula for the velocity of an air current, we have

$$v = \sqrt{\frac{pa}{ks}} = \sqrt{\frac{10.4 \times 48}{0.00000002 \times 154{,}000}} = 402.6 \text{ ft. per min.}$$

Will Illinois Operators Consolidate? And What About Frank Farrington?

Consolidation of the three operators' associations of Illinois is again being discussed hopefully by at least one group of operating interests within that state. The matter got a good deal of consideration in January immediately after the national settlement with the United Mine Workers and was frankly urged by a few men as a measure to strengthen the operators' position in labor relations as well as to spare the officers of the present associations the expensive and tiresome consumption of time from their personal business.

"Is Frank Farrington the man to be labor commissioner for such a united association?" is a question which comes up immediately in these discussions. "I should say not," one group of operators invariably replies. But there are others not so positive. Various other men are suggested as the logical candidates for such an important work, though it is difficult for anyone to suggest a man sufficiently gifted with "super-diplomacy" to draw together all the interests in that turbulent state and satisfy even a bare majority.

It is openly declared by men in the 5th and 9th District Operators' Association that the whole scheme would be nothing but a maneuver to put the mastery of the state in the hands of the operators of the southern Illinois field on a tonnage voting basis. The response is that southern Illinois has no such designs because the voting basis might be shifted to that of membership instead of tonnage, thus putting the power in the hands of the other regions of the state as opposed to the southern field.

In spite of the stirring up of waters just now it is well known that a serious effort will be made to draw together as much of the state as possible into a single operators' labor organization even if it means only the consolidation of the Central Illinois Operators' Association with the stronger Illinois Operators' Association, made up largely of operators in the great southern field of the state.

French Charge Germans with Bad Faith in Matter of Coke Supplies

The necessity of buying British coke at high prices has caused the Société des Coke de Hauts-Fourneaux, the pooling agency for the sale of metallurgical coke to French blast furnaces, to cancel as of Feb. 15 the price fixed for February delivery (Franco-German frontier basis) of 110 fr. up to 40 or 50 per cent of the capacity of consumption of the furnaces and 155 fr. beyond that. The new prices decided upon are 150 fr. and 200 fr. respectively. This action was made necessary by the inadequacy of coke supplies from Germany for the French blast furnaces and is one of the grievances of France against that country.

M. Robert Pinot, vice-president of the Comité des Forges de France, in a recent interview laid stress on the fact that one of the last notes of the German Government explicitly declared that "Germany was ready to supply French metallurgists with all the coke they needed, provided only they paid for it direct to Germany." It is contended by French metallurgists that there could have been no plainer confession of Germany's bad faith in this matter.

Would Require Certificate of Competence For Bituminous-Coal Miners

A bill introduced in the Pennsylvania House of Representatives by Representative James T. Heffran, Washington County, provides that there shall be established in each of the inspection districts in the bituminous-coal region of the state a miners' examining board to consist of nine miners who shall be appointed by the Governor as soon as the measure becomes a law and every two years thereafter. These boards shall examine all persons desiring to qualify as miners. Each member of the board shall be a miner with at least five years' practical experience. Upon his appointment he will serve for two years and his compensation will be $7.50 a day for each day served in connection with the work of the board.

The dates for the meetings of the board shall be advertised in two newspapers in each district and monthly meetings are provided for. These meetings will be public and any person desiring to become a bituminous-coal miner shall be examined as to his fitness for the work. Certificates of competency will be issued to all those who pass the examinations. The certificate will entitle a miner to work in any other district in the bituminous field, provided he is registered in the district to which he removes.

Each applicant must have had at least two years' experience as a miner and he must answer in the English language at least twelve questions pertaining to the requirements of a practical miner. The fee of each applicant is fixed at $2 while a registration fee of 25c. will be charged where a miner moves from one district to another.

No person will be permitted to work as a bituminous miner after Jan. 1, next, without having obtained a certificate, unless he is actually engaged in mining at the time the bill becomes a law, when he will be entitled to registration without examination upon producing satisfactory proof that he has been employed in any bituminous mine for a period of two years.

Rocky Mountain Coal Men in Winter Meet

The winter meeting of the Rocky Mountain Coal Mining Institute, held in Denver, Colo., Feb. 26, 27 and 28, was the most successful in years from the standpoint of attendance, entertainment and technical data presented. More than one hundred members registered, mostly from the states of Colorado, Utah, Wyoming and New Mexico.

An organization meeting was held Monday morning at the call of President F. W. Whiteside. The afternoon session was devoted to the reading of papers by A. L. Jones, district engineer for the General Electric Co., on "Electrical Problems in the Coal Mine," and by C. E. Drennan, electrical engineer for Hendrie & Bolthoff Manufacturing & Supply Co., entitled, "Why Alternating Current?" Both papers were of considerable interest and were thoroughly discussed. Extracts from papers and discussions of the whole program will be found in later issues of *Coal Age*.

Two hundred and fifty members and their ladies assembled in the banquet room of the Albany Hotel early in the evening for the banquet and "high jinx." Harry F. Nash, vice-president of the Oakdale and the Alamo coal companies, as toastmaster, introduced the speaker of the evening, George Sanford Holmes, of the *Denver Times*. The "high jinx," a fictitious meeting of the "Fact-Finding Commission," was put on by certain members of the Institute and was roundly applauded. A dance was enjoyed afterward.

On Tuesday morning F. A. Young, chief engineer of the St. Louis, Rocky Mountain & Pacific Co., presented an unusually interesting paper, "Air Cleaning of Coal at Brilliant, N. M." This was followed by "Pulverized Fuel," written by T. H. O'Brien, general manager of the Inspiration Consolidated Copper Co., but read by the secretary in Mr. O'Brien's absence.

In the afternoon Charles M. Schloss read the paper prepared by D. Harrington, supervising mining engineer of the U. S. Bureau of Mines; James C. Rae, general superintendent of the Owl Creek Coal Co., and himself, entitled, "Mining the Pitching Vein at Gebo, Wyo." The paper included the showing of moving pictures taken of this unusual operation. This was followed by moving pictures of rock drilling. Tuesday evening many members of the Institute went to the Orpheum Theater.

The Wednesday meeting was devoted to several short discussions and to the unanimous election of the following officers: President, George B. Pryde, general superintendent, Union Pacific Coal Co., Rock Springs, Wyo.; vice-president from Colorado, W. S. Getchell, superintendent, Walsen Mine, Colorado Fuel & Iron Co., Walsenburg; vice-president from New Mexico, W. D. Brennan, general manager, Phelps Dodge Corporation, Dawson; vice-president from Utah, Frank N. Cameron, general manager, Utah Fuel Co., Salt Lake City; vice-president from Wyoming, E. S. Brooks, vice-president and general manager, Union Pacific Coal Co., Rock Springs; secretary-treasurer, Benedict Shubart, Lindrooth, Shubart & Co., Denver, Colo.

Bituminous Coal Stocks Gain 2,000,000 Tons in Month; Higher Consumption Rate Lowers Days' Supply

Commercial consumers had in storage on Feb. 1, 1923, according to a survey undertaken by the Bureau of the Census and the U. S. Geological Survey, under authority of the Federal Fuel Distributor, approximately 38,000,000 tons of soft coal. This was 2,000,000 tons more than the stocks on Jan. 1, 1923, and represents a total increase of 16,000,000 tons since Sept. 1, 1922, when mining was resumed in the union fields that had been affected by the strike. Strictly comparable records are not available, but from the data at hand it is obvious that stocks on Feb. 1 must have been less than on the corresponding date in years for which statistics on stocks exist.

Measured in tons, stocks increased 5.5 per cent between Jan. 1 and Feb. 1. Measured in terms of days' supply, there was a decrease of 7.7 per cent, due to the increase in the rate of consumption in January. Assuming that the stocks were evenly divided, the supply on Feb. 1 was sufficient to last 24 days, against 26 days on Jan. 1. Such assumption may be made only for comparative purposes, however, as stocks are never evenly divided.

The trend of production has been downward during February and it is doubtful if stocks have increased perceptibly, if indeed there has not been a decrease.

Stocks on the Lake docks, classed as coal in transit, were 2,355,511 tons. Reports from a group of producers show that 730,000 tons of soft coal were in storage at the mines or at points between the mines and consuming centers.

Reports from byproduct coke plants indicate that there is no longer a surplus quantity of coke in storage. On Feb. 1 there were 146,000 tons on hand, which represented only a normal working supply.

Stocks of anthracite in the yards of retail dealers on Feb. 1 were 13 per cent less than on Jan. 1. The quantity of anthracite on the Lake docks was 68 per cent less than on the first of the year.

ESTIMATED TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL IN THE UNITED STATES *a*

(Net Tons)

Oct. 1, 1916	27,000,000	Aug. 1, 1921	41,100,000
Oct. 1, 1917	28,100,000	Nov. 1, 1921	48,500,000
July 15, 1918	39,700,000	Jan. 1, 1922	48,000,000*b*
Oct. 1, 1918	59,000,000	March 1, 1922	52,500,000*b*
Day of the Armistice	63,000,000	April 1, 1922	
Jan. 1, 1919	57,900,000	At least	63,000,000*bc*
April 1, 1919	40,400,000	Sept. 1, 1922	22,000,000*b*
March 1, 1920	24,000,000	Oct. 1, 1922	26,000,000*b*
June 1, 1920	20,000,000	Nov. 1, 1922	32,000,000*b*
Jan. 1, 1921	45,800,000	Jan. 1, 1923	36,000,000*b*
April 1, 1921	39,500,000	Feb. 1, 1923	38,000,000*b*

(*a*) The figures for 1918 in this table are based upon an actual count. Beginning April 1, 1919, the figures are estimates based upon reports from a selected list of 5,000 consumers whose stocks in 1918 bore a known relation to the known total stocks. (*b*) Subject to revision. (*c*) No canvass of consumers was made on this date. The total stock was estimated from the stock on March 1, ascertained by questionnaire.

From the foregoing table and the graphic presentation of the same data in Fig. 1 it is seen that coal flowed into storage during January at approximately the same rate as in the last two months of 1922. To those who have been watching the current statistics of production, it may seem surprising that only 2,000,000 tons were added to stocks in January, when production was nearly 4,000,000 tons more than in December. As a matter of fact, an appreciable part of the January production had not reached its destination on Feb. 1, and it could not therefore be taken into account in reckoning stocks. The most important factor which tended to keep stocks from reaching a higher level was a sharp increase in the rate of consumption. It is estimated that consumption plus exports during January was approximately 47,400,000 tons, or at the rate of about 10,700,000 tons per seven-day week.

Fig. 3 shows graphically the variation in stocks in each state. The map shows the days' supply held at general industrial establishments excluding steel and byproduct coke plants. This is the largest group of consumers and the one that shows best the distribution of stocks. Changes in activity in this group are quickly reflected in the coal market, and likewise changes in the coal market soon become apparent in the reserve stocks of industrials.

Taking the country as a whole, the stocks held by general industrials were sufficient to last 36 days. This was a decrease of 4 days from the supply on Jan. 1, 1923. Comparison with dates during preceding winter seasons for which records are available shows that on Feb. 1, 1923, stocks were lower than on any date except March 1, 1920. In six states only, Connecticut, Rhode Island, Louisiana, Oklahoma, Washington and the Northern Peninsula of Michigan, would the supply have lasted 60 days or more. In 15 states the supply was sufficient for less than 30 days.

Reports from the electric utilities indicated a slow accumulation of reserve coal, and the supply on Feb. 1 was sufficient to last 35 days. This was lower than the quantity usually on hand during the winter months.

As usual, the coal-gas plants had stocks much larger than any other class of consumers. On Feb. 1 such plants had on the average a 63-day supply, or more than two and a half times the average for all consumers combined. In ten states where coal gas is manufactured the plants had at least a 60-day supply.

Incomplete returns from byproduct coke and steel plants indicated an increase of about 10 per cent in the tonnage on hand. Owing to the increase in the rate of consumption, however, the days' supply—22 days—was the same as on Jan. 1. Steadily increasing activity in the steel industry has been responsible for a rapid increase in stocks of coal at byproduct coke and steel plants since the end of the miners' strike on Sept. 1, 1922. It is estimated that the total quantity on hand on Feb. 1 was no less than 112 per cent greater than on Sept. 1. The total stocks held by these two important classes of consumers has now reached a level where it compares favorably with the supply on dates when stocks were largest. The supply on hand Feb. 1 was 16 per cent less than on Jan. 1, 1922, 20 per cent less than on March 1, 1922, and 29 per cent less than on Jan. 1, 1919, when stocks at such plants were at the highest level recorded during the period over which stock statistics extend.

Estimates of railroad-fuel stocks, based on reports submitted by the American Railway Association, place the total quantity held by the railroads in stockpiles, cars and chutes on Feb. 1 at 7,573,000 tons, a supply sufficient for 18 days. In comparison with Jan. 1 this was an increase of 12 per cent.

Outside anthracite-burning territory the situation was

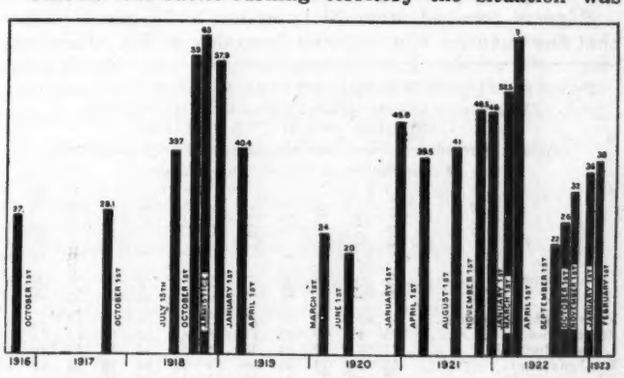


FIG. 1—TOTAL COMMERCIAL STOCKS OF BITUMINOUS COAL, OCT. 1, 1916, TO FEB. 1, 1923

Figures represent million net tons and include coal in hands of railroads, industrial consumers, public utilities and retailers. Coal for steamship fuel, on Lake docks, and in transit is not included. Figures for 1922 and 1923 are subject to revision.

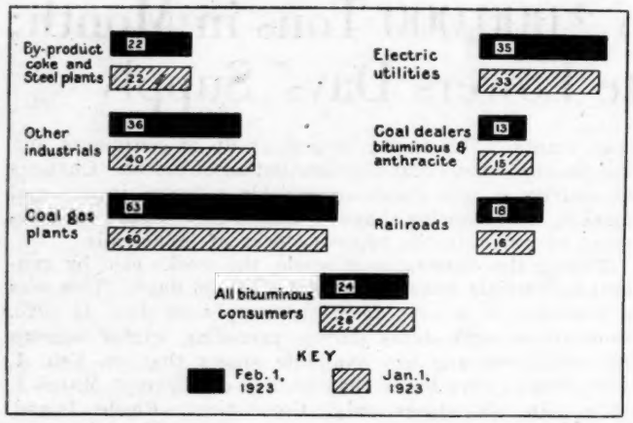


FIG. 2—DAYS' SUPPLY HELD BY DIFFERENT CLASSES OF CONSUMERS ON FEB. 1, 1923, AND JAN. 1, 1923

At the rate soft coal was burned in January, 1923, the stocks on hand Feb. 1 were sufficient to last 24 days. The stocks on Jan. 1 were sufficient to last 26 days at the rate of consumption in November and December, 1922. Thus, owing to the increase in the rate of consumption during January, the larger stocks on Feb. 1 were sufficient for 2 days less time than the stocks on Jan. 1.

as follows: Stocks increased perceptibly in the Middle Atlantic States and in the coal-producing states north of Tennessee and west to Utah. In New England and in the Southern and Gulf States stocks decreased. Despite the increases in many states, in only six was the supply sufficient to last 30 days or more.

It is estimated that during January there was an increase of at least 1,500,000 tons in the tonnage moving to consumers, and which was not accounted for in their reports.

Drafts on the stocks of bituminous coal on the commercial docks of Lakes Superior and Michigan totaled 760,152 tons. There were no receipts and the tonnage on hand declined from 3,129,206 tons on Jan. 1 to 2,369,054 tons on Feb. 1. In comparison with the stocks on the corresponding date a year ago there was a decrease of 61 per cent. These figures do not include coal on private docks of industrial consumers, which is included in consumers' supply.

The quantity of unbilled coal in cars at the mines increased from 73,000 tons on Jan. 1 to approximately 165,000 tons on Feb. 1. Thus it is seen that the coal already mined and awaiting purchasers no longer forms an appreciable part of the reserve.

The accumulation of cars at gateways and terminals increased in January, but the quantity at such points—65,000 tons—was much smaller than during the period of acute traffic congestion following the miners' strike during the past summer.

Reports from an incomplete list of producers equipped to store show that 730,000 tons were in storage on Feb. 1 at the mines, against 770,000 tons held by the same producers on Jan. 1. The number of producers who store is small, but the quantity in storage at times may be considerable.

Reports received from 20 byproduct coke plants stated that the quantity now on hand from day to day represents merely a normal working supply. On Feb. 1, 1923, these plants had on hand 145,839 tons of coke. On Jan. 1 the same plants had 212,261 tons and on March 1, 1922, when the accumulation was largest, the quantity of unsold coke was 870,000 tons. A large part of the surplus found its way to householders as a substitute for anthracite.

Owing to the large deficit in anthracite production in 1922, caused by the 23-weeks miners' strike, consumers of this fuel have turned to bituminous coal as a substitute. It is necessary therefore to reckon the supply of the retailers in anthracite-consuming territory in terms of anthracite and bituminous combined.

There are no available statistics on householders' stocks but in view of the fact that householders had but little opportunity to lay in supplies during the summer and that shipments since September have been on the basis of 60 per cent of shipments in 1921, it seems highly improbable that householders now have any considerable supply.

January deliveries of anthracite by retailers exceeded receipts and stocks declined to the lowest point on record, excepting only Sept. 1 and Oct. 1, 1922. Stocks in the yards of 371 dealers were nearly 13 per cent less on Feb. 1, 1923, than on Jan. 1, and they were a bare third and even a quarter of those during preceding winter seasons. On the average retailers' stocks of anthracite were sufficient to last 8 days, whereas the supply on March 1, 1920, a month later in the season, were sufficient for 21 days, and on March 1, 1922, for 28 days.

The production of anthracite continued at a high rate during February, but severe winter weather has prevailed in the anthracite consuming area, and it hardly seems probable that the reserve is now any larger than on Feb. 1.

ANTHRACITE IN YARDS OF A SELECTED LIST OF RETAIL COAL DEALERS (*a*)

Date	Net Tons	Days' Supply (*b*)	Date	Net Tons	Days' Supply (*b*)
1919—Jan. 1	902,950	36	1922—Sept. 1	138,399	5*c*
Apr. 1	846,731	31	Oct. 1	276,480	7*c*
1920—Mar. 1	709,552	21	Nov. 1	448.944	11
1921—Jan. 1	687,851	24	1923—Jan. 1	402,407	11
1922—Jan. 1	1,295,806	44	Feb. 1	351,083	8
Mar. 1	1,075,319	28			

(*a*) Based on statements from 371 identical dealers who reported on each date. (*b*) Calculated at current rate of delivery to consumers, which varies. (*c*) Calculated at rate of delivery in September, 1921.

According to the reports received from retailers the rate of delivery of bituminous coal in the anthracite consuming territory during January was 20 per cent larger than in November and December, 1922, during which period such deliveries were 40 per cent larger than in the corresponding period of 1921. This may be accepted as a broad measure of the extent to which bituminous coal has been used to fill the gap in anthracite production.

Despite the substitution of bituminous coal for anthracite, total stocks of all coal, anthracite and bituminous, in the

DAY'S SUPPLY OF BITUMINOUS COAL IN HANDS OF VARIOUS CLASSES OF CONSUMERS IN THE UNITED STATES, NOVEMBER, 1918, TO FEB. 1, 1923 (*a*)

(Figures represent number of days supply would last at current rate of consumption at time of stock-taking)

	Nov. 11, 1918	Jan. 1, 1919	Mar. 1, 1920	Jan. 1, 1921	Apr. 1, 1921	Jan. 1, 1922	Mar. 1, 1922	Sept. 1, 1922	Oct. 1, 1922	Nov. 1, 1922	Jan. 1 (*b*) 1923	Feb. 1 (*b*) 1923
Byproduct coke plants	35	32	15	29	28	42	39	11	14	18	22	22
Steel plants	45	42	9	42	38	48	48	12	17	21		
Other industrials	71	65	27	64	47	51	56	32	33	39	40	36
Coal gas plants	85	81	31	55	66	89	82	34	38	55	60	63
Electric utilities	49	49	21	44	48	51	54	26	30	32	33	35
Coal dealers, bituminous	37	39	13	30	26	33	23	11	18	21	18	15
Railroads	31	32	11	23	24	35	42	13	15	13	16	18
Total bituminous	45	42	18	39	36	41	43	17*c*	21*c*	23*c*	26*c*	24*c*

(*a*) The figures in this table are estimates based on incomplete data. (*b*) See text for rate consumption at which these figures were calculated. (*c*) Subject to revision.

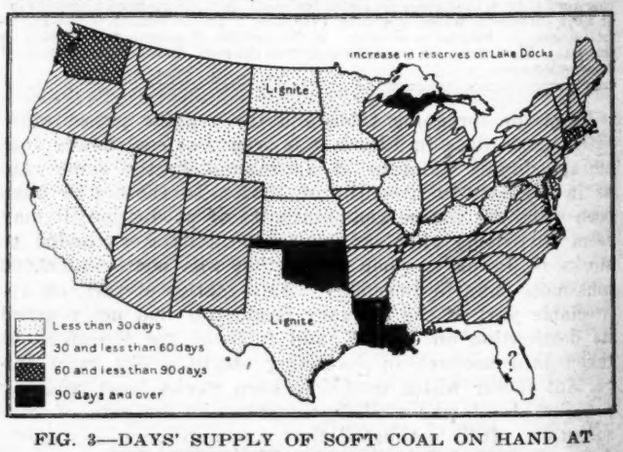


FIG. 3—DAYS' SUPPLY OF SOFT COAL ON HAND AT INDUSTRIAL PLANTS ON FEB. 1, 1923

At the rate of consumption prevailing in January, stocks at industrial plants other than steel and byproduct coke would last on the average 36 days. How the supply varied from state to state is shown in the diagram. The darker the shading the heavier were the stocks. Any change in business activity affecting coal consumption would be reflected in the days' supply. Based on reports from 2,172 plants.

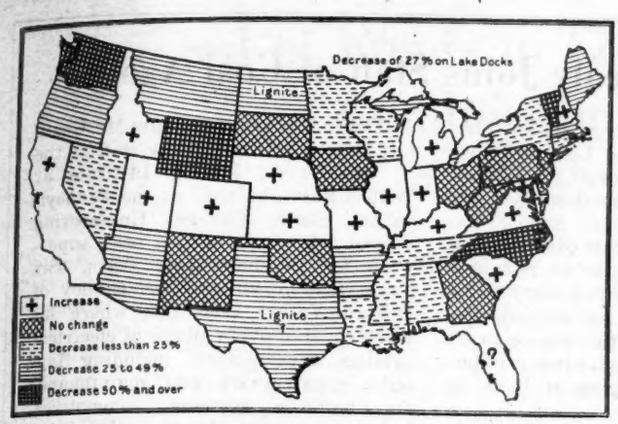


FIG. 4—HOW RETAILERS' STOCKS OF ALL COAL, ANTHRACITE AND BITUMINOUS, ON FEB. 1, 1923, COMPARED WITH THOSE ON JAN. 1, 1923

Stocks of bituminous coal in retail yards on Feb. 1 were 3 per cent less than on Jan. 1. Stocks of anthracite were 13 per cent less than on New Year's Day. The total stocks of retailers, including both hard and soft coal, decreased 6 per cent during January. The map shows the decline to have been most severe in the North Atlantic states, the Northwest territory served from the Lake docks, and in the South and Southwest. In the belt of states from Virginia and the Southern Peninsula of Michigan to Utah stocks in the hands of retailers increased.

retail yards of the anthracite territory was considerably below normal. On Jan. 1, 1923, the total reserve supply was nearly 50 per cent less than on Jan. 1, 1922. Stocks continued to decline in January, and on Feb. 1 the total coal held by retailers was nearly 7 per cent less than on Jan. 1, 1923. Over the country as a whole, retailers' total stocks were 6 per cent less on Feb. 1 than on Jan. 1. From the map in Fig. 4 it is seen that stocks declined in nearly every state in the anthracite-consuming territory. The most notable exception was the Southern Peninsula of Michigan, where increased receipts of bituminous coal were responsible for a 9 per cent increase in total stocks.

Stocks of anthracite on the Upper Lake Docks, as reported by the Northwestern Coal Dock Operators' Association, stood at 57,636 tons on Feb. 1, against 177,644 tons on Jan. 1, 1923. Stocks of anthracite on the Lake docks were less than 6 per cent of those on Feb. 1 a year ago.

Jan. 1, 1922	1,331,507	Jan. 1, 1923	177,644
Feb. 1, 1922	1,030,170	Feb. 1, 1923	57,636

Lack of complete information makes it impossible to state the quantity of coal in the storage yards of producers. The demand has been such, however, that it seems improbable that any considerable quantity was added to stocks, in which event the quantity was practically negligible.

Permanent Injunction in Maynard Case May Have Far-Reaching Effect

The entire coal industry of the United States may be affected by the decision handed down by Justice Bailey, in the Supreme Court in the District of Columbia, making permanent an injunction restraining the Federal Trade Commission from requiring the Maynard Coal Co., of Columbus, Ohio, to submit monthly reports on the cost of coal production. The case had been pending in the court for three years. A temporary injunction was first granted.

The suit was brought by the National Coal Association, using the name of the Maynard Coal Co., according to George H. Barker, vice-president of the company. Mr. Barker stated that the action was filed on the ground that information sought was a duplication of reports submitted to other government departments, one of them the Treasury Department, and that to file reports on special blanks required by the Trade Commission would involve unnecessary expense in the accounting division of every coal company in the country.

Mr. Barker stated that he was unable to say whether Justice Bailey, in his decision, would relieve all other coal companies from the necessity of submitting monthly reports.

Heavy Premium Paid in Massachusetts for "Independent" Anthracite, Report Says

Retail coal dealers in Massachusetts paid over $800,000 premiums in excess of "company" prices for anthracite during the period between Oct. 1, 1922, and Jan. 1, 1923, declares a report of the Special Commission on Necessaries of Life filed with the Legislature of that state.

The commission makes public a list of Massachusetts jobbers and outside jobbers who, it asserts, charged more than $9.50 per ton for coal. Massachusetts jobbers, the report shows, sold to the retail dealers of the state 154,491 tons of coal at prices ranging from $9.65 to $14.50 per ton while outside jobbers sold 85,390 tons at prices ranging from $10 to $14.50 per ton.

Declaring that "there was considerable criticism" when the Federal Fuel Administration during the war allowed all "independent" producers a maximum premium of 75c. a ton over the price of "company" coal, its purpose being to stimulate production, the commission in its report says: "In the present emergency the premium on spot 'independent' coal is as high as $6.25 a ton over the price of 'company' coal."

Some jobbers informed the commission that they handled only a few cars of the high-priced coal as an accommodation to regular customers. Some stated that their margin of profit was only 25c. per ton, while others made no qualifying statement in regard to their dealings.

Commenting on the plan of distribution the commission's report says: "Under the prevailing system of the Pennsylvania Fuel Commission for distributing anthracite this large amount of high-priced coal has reduced the allotment to Massachusetts of a larger amount of lower-priced coal. There is no apparent shortage of this high-priced coal. Undoubtedly our retail dealers intended by purchasing this coal to increase the amount of coal received by their communities. Their action, however, apparently has resulted in raising the price of speculative coal and thus the price our householders must pay."

Arista Disaster Laid to Blown-out Shot

The coroner's jury investigating the explosion on Friday, March 2, at the Arista mine of the Weyanoke Coal & Coke Co., in Mercer County, West Virginia, in which ten lost their lives and twenty-eight others were injured, found that it was due to a blown-out shot, unlawfully loaded, unlawfully tamped or not tamped at all, in the working place of James B. McCloud, who was among those killed. There were no eye-witnesses at the inquest, as all the men in the immediate vicinity of where the explosion had occurred were killed, and hence the mine department had only supposition upon which to proceed. The hole in the working place of McCloud which caused the explosion and three sticks of dynamite found in McCloud's powder box were a part of the evidence upon which witnesses based their testimony. The opinion entertained by mine inspectors, as told to the coroner's jury, was that the dynamite had exploded first, shaking the walls of the mine and raising the dust, and that the powder had then become ignited, blowing out the drillhole and setting fire to the dust.

Fuel Situation Improved in Northeast; To Report Stocks April 1 and June 1

Federal Fuel Distributor Wadleigh reported on March 11 that there has been some improvement in the fuel situation in New England and northern New York. Largely due to motive power trouble, there still is room for great improvement in the railway service. Difficulties continue in New England harbors and a number of applications for service orders intended to give priority to the discharge of coal cargoes have been filed. Mr. Wadleigh stated that it is the present plan to issue another stock report on April 1 and still another on June 1.

E. J. Gealy Joins Staff of Coal Age

E. J. Gealy, recently assistant electrical engineer for the Lehigh Valley Coal Co. and supervisor of the Wilkes-Barre branch of the Pennsylvania State College Extension School, has joined the editorial staff of *Coal Age*.

Mr. Gealy was born in Scranton and is a graduate of Pennsylvania State College, where he studied electrical engineering with respect to its application to the coal-mining industry, receiving the degree of B. S. on graduation.

Following his graduation Mr. Gealy was employed by the D., L. & W., now the Glen Alden Coal Co., of Scranton. Several years later he received an advanced degree in electrical engineering covered by a thesis on "The Alternating-Current Induction Motor as Applied to Mine Hoists."

Within the past five years Mr. Gealy has been a teacher on the staff of the Y. M. C. A. Mining Institute at Wilkes-Barre as well as the Pennsylvania State College Engineering School, of which he has been supervisor for the past three years. Six years ago he entered the employ of Lehigh Valley Coal Co., where his work covered every phase of electrical mining development, including layouts, construction and maintenance for haulage systems, locomotives, hoists, pumps, fans, substations, power plans, power lines, breaker drives, washery drives and compressor drives.

Mr. Gealy also had charge of the layout of the first automatic substation in the anthracite field, located at Drifton.

I. R. T. Asks Approval on Bids for Coal On Basis of $3.89 per Net Ton at Mine

The Interborough Rapid Transit Co., New York City, will get its coal supply for this year on a base price of $7.50 per gross ton at the power houses, or a mine price of about $3.89 per net ton at the mines, if the Transit Commission of New York approves of the proposed agreement.

The contract provides that the 800,000 gross tons to be furnished by the companies to whom it is apportioned shall be Pennsylvania low-volatile bituminous coal, navy standard, as heretofore supplied. Of the tonnage the Berwind-White Coal Mining Co. is to furnish 444,000 tons; Consolidation Coal Co., 296,000 tons and the Logan Coal Co., a Philadelphia organization with mines at Dunlo, Pa., 60,000 tons.

The proposed contract contains a sliding-scale provision for any increase or decrease in freight rates or miners' pay and the contractors also agree to give the transit company the benefit of lower prices if they make contracts for coal of the same grade at lower prices to other consumers at New York harbor, or if they sell without contracts any such coal at lower prices they agree to furnish the transit company with an equal amount under contracts at such prices.

The committee of the Board of Directors of the Interborough Rapid Transit Co. that drew up the contract believes that these provisions, "which are unusual in contracts of this kind, insure a lower cost per heat unit than could be obtained by any other method, in view of existing conditions."

Referring to the investigation recently made by a committee representing New York City, of which David Hirshfield, Commissioner of Accounts, was chairman, into conditions at the mines of the Berwind-White Coal Mining Co. the committee's report says:

"We have not overlooked certain matters relating to labor disputes and alleged mining conditions at the Berwind-White mines. We have looked into these matters not only in the interest of the Interborough company but out of courtesy to the city administration, which has given attention to the subject. We are not able, however, to convince ourselves that these matters should be permitted to swerve our business judgment as to what is best for the public, the city and our own company. All things considered, we believe that we have taken the only prudent course open to us in the circumstances."

The committee says that during the coming year it will give consideration to the use of oil for fuel and also to the acquisition of storage facilities and additional equipment, so that, if deemed advisable, coal may be purchased in open competition.

The committee that drew up the proposed contract, after considerable study of the fuel situation, was composed of Abel E. Blackmar, former Chief Justice of the Appellate Division, Supreme Court, Second Department, Kings County, who represents the public on the Board of Directors; Thomas I. Parkinson, vice-president of the Equitable Life Assurance Co., and Samuel W. Reyburn, of Lord & Taylor. Before it is accepted by the Interborough Co. the contract must be passed upon by the Transit Commission.

Second Herrin Trial Reviews Massacre; More Politics in the Case

The second Herrin trial now progressing at Marion, Ill., has developed little evidence concerning the slaughter of 22 non-union strip miners near Herrin, Ill., last June that was not brought out in the first trial which ended six weeks ago in acquittal for the prisoners—union miners in a solidly unionized community. Hugh Willis, union board member and one of the five defendants charged with the murder of a Polish guard at the besieged strip mine of the Southern Illinois Coal Co., has again and again been charged by witnesses with inciting the mob to the slaughter after the non-union men had surrendered to the mob. The bloody details of the killing have been reviewed in various ways and the testimony of state's witnesses plods steadily along while the Williamson County populace pays little attention to the case and none of the observers feels that a conviction is possible.

Some of the witnesses for the state, who testified clearly and damningly against the mine-union defendants at the first trial, have been put back on the stand during the past week, but too often they have "forgotten" so much about the case that their evidence has not been weighty and the prosecutors have dismissed them with disgust.

While the trial droned along the state appropriation of $75,000 to finance the prosecution, which passed the Legislature late in February, had to be rescued from the dust at the bottom of a drawer in Governor Small's desk. Somebody pointed out in a Senate session that the Governor's allotted ten days to sign or return the bill had elapsed, that nothing had happened and that the bill might die from inaction. So a committee waited to His Excellency.

"Do you mind if we take this bill to the Secretary of State now that you have decided not to sign it?" asked the chairman of the committee.

"I don't care anything about it," said the Governor. "Take it along."

So they took it along, while a Senator remarked that he was informed by old-time state officials that never before had a Governor proceeded in such a manner regarding a bill.

Assured of Funds to Complete Its Investigation, Coal Commission Speeds Up Work

By Paul Wooton
Washington Correspondent of *Coal Age*

With the removal of uncertainty with regard to its appropriation and in fact its very existence, the President's Coal Commission is bustling with increased activity. The statistical force has been expanded and tabulation of information contained on the questionnaires has been speeded up decidedly. During the week ended March 10 a material increase in the rate of tabulation was achieved. The returns also are coming in in greater numbers.

A large number of the questionnaires were filled out prior to the enactment of the law providing special penalties for false returns. It is probable that the commission will send out some form of statement to be signed by the persons making those returns which will certify that the questionnaire is resubmitted as correct. This action will not be taken with any idea that incorrect returns have been made but on the belief that the conclusions of the commission will have more weight with the public if it is known that they are based on sworn statements. As a matter of fact, it is probable that the original act fixed full legal responsibility for the correctness of returns. Certainly were the commission to entertain any doubt as to the correctness of any return, it could have compelled verification, even if it were necessary to bring all the books of the company to Washington. In that connection, however, Commissioner Smith points out that the club provided was too big to use.

New questionnaires now are being prepared to cover certain phases of distribution. The American Wholesale Coal Association and the Retail Coal Merchants Association are being consulted in connection with the preparation of these schedules.

The field investigations in connection with wholesale and retail practices in the larger cities are now being completed. The work is practically complete in Buffalo, Chicago, Columbus, Detroit, Indianapolis, St. Louis, Minneapolis and St. Paul. The survey of the Northwest docks also is practically complete.

Commissioner Smith announced on March 10 that C. E. Lesher, who is in charge of the engineering phases of the commission's investigation, is strengthening his force and will speed up that important part of the fact finding. Through an arrangement with the Bureau of Mines, George T. Halderman has been added to the engineering staff. Mr. Halderman is a coal-mining engineer with diplomas from Pennsylvania State College and the University of Pittsburgh. Prior to accepting service with the Bureau of Mines he was employed by the Lehigh Valley Coal Co., the Peabody Coal Co., the Colorado-Utah Coal Co. and other producers.

When Commissioner Smith was informed that all of the retailers were not prepared to "swallow" the commission's plan for encouraging storage during the summer of domestic fuel, he remarked that such plans as that proposed by the Connecticut company and the modifications of that plan likely to be adopted by other large employers could be made unnecessary were retail dealers willing to work out some plan of their own to stimulate summer storage of household fuel. It is understood that the Retail Coal Merchants Association will call a meeting in the near future to consider the whole subject of storage.

The commission cannot be accused of setting the scene for its report, Dr. Smith pointed out, since, by doing all in its power to encourage storage and to prevent any shortage next autumn, a situation has been created whereby the public will not be concerned about coal at the time the commission's report will be issued. It can clearly be foreseen that Sept. 22 will not be a highly propitious time to obtain for the report the maximum amount of public attention. Nevertheless Dr. Smith believes that there has been a widespread absorption of knowledge concerning coal during the past few years.

It is the plan of the commission to make available to the conferees on anthracite wage scales all information that will be of service to them at the earliest possible time.

Dr. Smith spent most of the week of March 5 in New York and Philadelphia, where he conferred with a number of persons interested in the coal investigation.

Washington Mines May All Be Open Shop

A request for a reduction of $1.50 in the day-wage scale of union coal miners in Washington State having been refused at a joint conference at Seattle, March 5, and adjournment taken *sine die*, indications point to the five remaining union companies going on an open-shop basis.

The present situation in the Washington coal-mining district began to develop with the refusal of the international union to authorize the Allport commission recommendations determined under instructions by the Bituminous Coal Commission award of March 10, 1920, and concurred in by John P. White, minority member of the commission. This award provided approximately 14 per cent above the 1919 scale award, but it was nevertheless repudiated and a demand made for an advance of $1.50 in the day-wage scale, effective Aug. 16, 1920.

This increase was paid until March, 1921, commercial mines continuing to operate on account of the urgent necessity for railway fuel, but then the State Director of Labor and Industries, to break the deadlock, reconvened the Allport commission and a modified scale was indorsed by the state union. Official concurrence by the international union was again withheld, and as result all but five companies became open shop on the basis of the Allport rates, the five remaining companies, including railroad mines, seeking continuation of relations with the union until the U. S. Coal Commission could determine the facts and make recommendations.

M. H. Taylor, of Pittsburgh Coal Co., Dies

Matthew H. Taylor, chairman of the Board of Directors of the Pittsburgh Coal Co. since 1907, died in Atlantic City on March 7. He was 75 years old. Mr. Taylor was born in Huntingdon, Pa., a son of Judge Taylor. Early in life he moved to Erie, Pa., where he became identified with the W. L. Scott coal interests and at the time of his death was a trustee of the W. L. Scott estate.

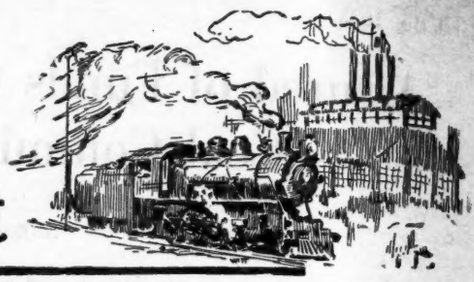
Besides being chairman of the Board of Directors of the Pittsburgh Coal Co. Mr. Taylor was vice-president of the Erie & Pittsburgh Railroad Co., president of the Montour Railroad Co. and a director of the Second National Bank of Erie.

Industrial Activity Pronounced in January

Late figures on January business conditions, according to the survey of current business, reprinted from Commerce Reports, continue to show pronounced activity throughout the industries. Although the building-material industry shows the most activity, there has been a noticeable advance in activity in almost all lines, with production figures close to or exceeding the 1920 peaks. Additional high production records since early in 1920 were made in January by copper, glass bottles, clay fire brick, silica brick, and enamel sanitary ware.

The cost of living figures show a slight decline in spite of the rising tendency of wholesale prices. Prices received by farmers for crops and live stock also advanced, notwithstanding declines in wholesale prices of agricultural products.

Production and the Market



Weekly Review

No surprise was occasioned in the coal trade by the government stock report, issued late last week, showing a gain during January of 2,000,000 tons of soft coal in the hands of consumers, thus indicating a total of 38,000,000 tons on Feb. 1. It is conceded that almost an equal amount was lost during February, for consumption was at a higher rate than in January and production at a lower rate. February output of soft coal was 42,130,000 tons, a drop of 16 per cent in average daily production. Consumption and exports during January are estimated by the government at 10,700,000 tons per week.

Demand for soft coal in the East is fast being relieved of retail-dealer orders, a fact partly accounting for the softness of the market. *Coal Age* Index of spot prices of bituminous coal at the mines dropped 11 points to 268 on March 12, the corresponding average price being $3.24.

Export Demand Strong

The only feature of the week is the gradual development of export demand. Interest, of course, lies in the inquiries for Germany, France, and other continental European countries. Some orders have been closed and vessels have been chartered. The immediate effect has been a gain in movement to the West Indies and other nearby offshore markets. A sharp demand last week advanced Pocahontas at Hampton Roads by $1 per ton and high-volatile Kanawha gas coals were up to $6@ $6.25 f.o.b. Hampton Roads on March 10. Altogether it was estimated that upward of 250,000 tons of coal had been engaged for shipment to foreign countries and that 25 vessels had been chartered.

In the Midwest the domestic market has been affected by the season. The volume of domestic coals has fallen off, with indications of a further slump in prices. There is enough coal in the Northwest to keep the market calm on almost every kind of coal. Industrial conditions have improved sufficiently around the upper Lakes to move considerable coal off the docks, leaving little except fuel under contract. Of the 1,200,000 tons on the Duluth-Superior docks, most of it is screenings. Quotations for southern Illinois and Standard coals remained on about the same basis, while nearly every other grade, excepting Pocahontas and New River took a drop.

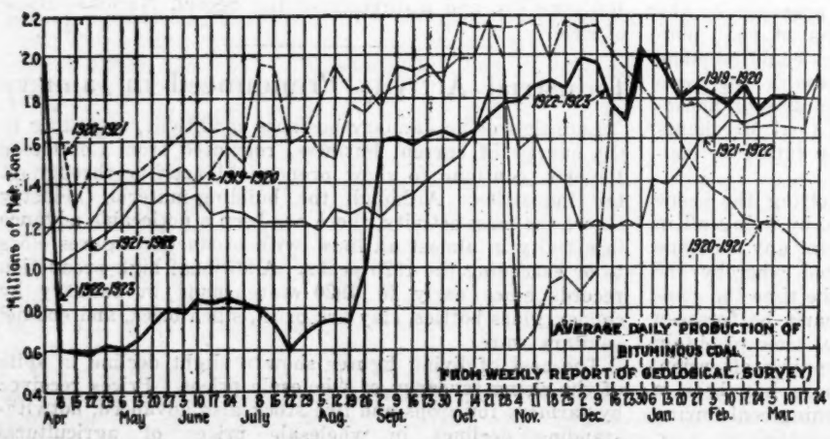
Eastern Situation Quiet

In the East there is less complaint about car shortage, which has not changed materially from last week. Coal stocks are equal to requirements and consumers in some sections appear to be eating into their reserve supplies. In New England manufacturers are endeavoring to maintain their 60- and 90-day reserves. There is a better outlook for manufactured goods and mill buyers show more interest in the market. The demand for Southern coals from abroad had a tendency to increase the activity of large consumers. At various terminals there was some delay in discharging boats.

Present estimates of soft-coal production in the week ended March 3, according to the Geological Survey, indicate a total output of 10,860,000 net tons, including coal shipped, mine fuel, local sales, and coal coked. This is an increase of more than one-half million tons over the revised estimate of 10,323,000 tons for the week preceding.

Preliminary reports of cars loaded in the week of March 5-10 show 42,194 cars loaded on Monday, a decrease to 33,181 cars on Tuesday and to 28,296 cars on Thursday. Loadings for the first four days of the week were slightly below those for the corresponding days of the preceding week. The total output probably will be between 10,750,000 and 10,850,000 tons.

The anthracite situation continues active. Domestic



Estimates of Production

(Net Tons)

	1922	1923
BITUMINOUS		
Feb. 17	10,285,000	10,431,000
Feb. 24 (*b*)	10,402,000	10,323,000
Mar. 3 (*a*)	10,541,000	10,860,000
Daily average	1,757,000	1,810,000
Coal year to date	390,892,000	377,729,000
Daily average coal year.	1,381,000	1,333,000
ANTHRACITE		
Feb. 17	1,703,000	1,828,000
Feb. 24	1,701,000	1,838,000
Mar. 3	1,913,000	2,104,000
Coal year to date	81,427,000	47,317,000
COKE		
Feb. 24 (*b*)	157,000	371,000
Mar. 3 (*a*)	143,000	394,000
Calendar year	1,140,000	3,153,000

(*a*) Subject to revision. (*b*) Revised from last report.

sizes are moving steadily, but there has been less demand for the product of the small independent operators, with the result that their quotations have dropped. Steam coals are easier and quotations also are easier.

The movement in contracting for Connellsville furnace coke for the second quarter is now nearly completed. The great bulk was done at $7 but three or four of the latest contracts were at $7.25, the operators holding out for that price on account of quality and service. Car service in the region has been practically adequate for the past thirty days.

Midwestern Steam Market Firmer

It is obvious to most coal producers and sales companies in the Midwest that the domestic market is flat for the season. The volume of domestic coals from all fields has fallen off steadily and swiftly during the last ten days and efforts to hold circular prices in line cannot be effectual much longer. The dealer trade is determined that lump, egg and nut prices must drop lower at once. The result of all this is that the high-cost mines are beginning to shut down and the volume of coal produced has fallen to such an extent that screenings are giving just enough evidence of shortness so that the prices on them are firming a little at last. Southern Illinois screenings, which have sold down to $2.25 as a regular thing, have risen until $2.50 is more nearly an average. Central Illinois screenings have inched upward from $1.15@$1.25 nearly to $1.50, leaving only Standard district screenings unchanged from the week before. The principal reason for this is that Standard domestic sizes have been selling more steadily as they are the cheapest fuel in Illinois.

Southern Illinois field conditions are not happy. No-bills are piling up there, as they have been in all other Illinois regions for weeks. Railroad tonnage is light. Most roads have been entirely satisfied with their minimum contract quantities. Unfilled orders are now largely a thing of the past, for car supply has grown better and almost any mine that wants to run can easily get 60 jer cent of its rating, if not more. Shutdowns are the result.

Kentucky Prices Breaking

In Kentucky mild weather has cut down demand for domestic fuel, and as a result of there being some distress transit coal on some of the markets, there probably is no coal

Current Quotations—Spot Prices, Bituminous Coal—Net Tons, F.O.B. Mines

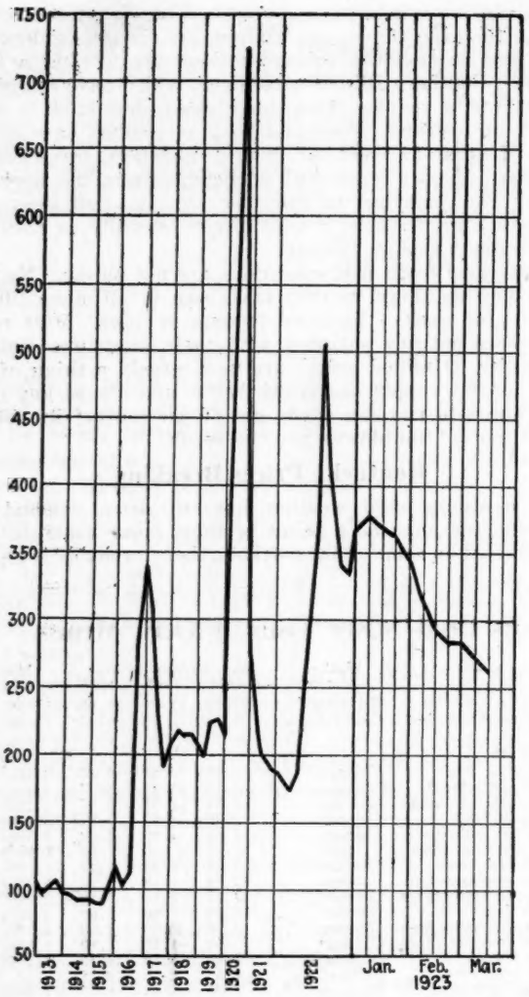
Low-Volatile, Eastern	Market Quoted	Mar. 13 1922	Feb. 26 1923	Mar. 5 1923	Mar. 12 1923†
Smokeless lump	Columbus	$3.15	$7.00	$7.00	$6.50@$7.50
Smokeless mine run	Columbus	1.85	4.50	4.50	4.25@ 4.75
Smokeless screenings	Columbus	1.45	4.45	4.45	4.25@ 4.65
Smokeless lump	Chicago	3.15	7.00	7.00	6.75@ 7.25
Smokeless mine run	Chicago	1.85	4.50	4.50	*3.50@ 4.50*
Smokeless lump	Cincinnati	3.15	7.50	7.00	*6.75@ 7.00*
Smokeless mine run	Cincinnati	1.75	4.75	4.75	*4.75@ 5.00*
Smokeless screenings	Cincinnati	1.15	4.10	4.75	*4.50*
*Smokeless mine run	Boston	4.60	6.20	6.15	**6.75@ 7.25**
Clearfield mine run	Boston	1.95	3.75	3.50	*2.85@ 3.75*
Cambria mine run	Boston	2.45	4.35	4.10	*3.50@ 4.50*
Somerset mine run	Boston	1.90	4.00	3.75	*3.25@ 4.00*
Pool 1 (Navy Standard)	New York	2.95	4.75	4.75	*4.25@ 4.75*
Pool 1 (Navy Standard)	Philadelphia	3.05	4.70	4.65	*4.40@ 4.80*
Pool 1 (Navy Standard)	Baltimore	2.65	.....	.....	.....
Pool 9 (Super. Low Vol.)	New York	2.40	3.85	3.85	**3.50@ 4.00**
Pool 9 (Super. Low Vol.)	Philadelphia	2.45	4.25	3.80	**3.50@ 4.20**
Pool 9 (Super. Low Vol.)	Baltimore	2.15	3.50	4.00	3.75@ 4.25
Pool 10 (H.Gr.Low Vol.)	New York	2.00	3.50	3.35	*2.75@ 3.50*
Pool 10 (H.Gr.Low Vol.)	Philadelphia	2.10	3.60	3.45	*3.00@ 3.40*
Pool 10 (H.Gr.Low Vol.)	Baltimore	2.10	3.25	3.00	3.00
Pool 11 (Low Vol.)	New York	1.70	2.90	2.45	1.90@ 3.00
Pool 11 (Low Vol.)	Philadelphia	1.75	3.05	2.90	*2.50@ 2.90*
Pool 11 (Low Vol.)	Baltimore	2.05	2.60	2.25	2.25
High-Volatile, Eastern					
Pool 54-64 (Gas and St.)	New York	1.60	2.25	2.30	*2.00@ 2.40*
Pool 54-64 (Gas and St.)	Philadelphia	1.50	2.45	.....	2.00@ 2.35
Pool 54-64 (Gas and St.)	Baltimore	1.55	2.65	2.25	2.25
Pittsburgh scr'd gas	Pittsburgh	2.70	4.10	4.10	*3.25@ 4.00*
Pittsburgh mine run (St.)	Pittsburgh	2.15	2.75	2.75	*2.50@ 2.60*
Pittsburgh slack (Gas)	Pittsburgh	1.65	2.80	2.85	*2.75*
Kanawha lump	Columbus	2.50	4.50	4.50	*3.75@ 4.75*
Kanawha mine run	Columbus	1.60	2.85	2.85	*2.50@ 2.75*
Kanawha screenings	Columbus	1.40	2.45	2.50	*2.00@ 2.25*
W. Va. lump	Cincinnati	2.50	4.75	4.00	*3.50@ 4.00*
W. Va. Gas mine run	Cincinnati	2.15	2.75	2.75	**2.75@ 3.00**
W. Va. Steam mine run	Cincinnati	1.35	2.50	2.75	2.50@ 3.00
W. Va. screenings	Cincinnati	1.30	2.35	2.35	**2.50**
Hocking lump	Columbus	2.60	4.30	4.15	*3.75@ 4.25*
Hocking mine run	Columbus	1.90	2.60	2.60	*2.35@ 2.50*
Hocking screenings	Columbus	1.50	2.10	2.15	*1.90@ 2.15*
Pitts. No. 8 lump	Cleveland	3.05	4.35	4.05	*3.75@ 4.25*
Pitts. No. 8 mine run	Cleve'and	$1.90	$3.85	$3.00	*$2.85@$3.00*
Pitts. No. 8 screenings	Cleveland	1.75	2.90	2.90	*2.65@ 2.85*
Midwest					
Franklin, Ill. lump	Chicago	3.45	4.60	4.60	4.50@ 4.75
Franklin, Ill. mine run	Chicago	2.50	3.35	3.35	3.25@ 3.50
Franklin, Ill. screenings	Chicago	1.85	2.35	2.35	2.25@ 2.50
Central, Ill. lump	Chicago	2.80	3.35	3.35	*3.00@ 3.25*
Central, Ill. mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Central, Ill. screenings	Chicago	1.75	1.60	1.30	**1.40@ 1.50**
Ind. 4th Vein lump	Chicago	3.25	4.35	4.35	*3.50@ 3.75*
Ind. 4th Vein mine run	Chicago	2.40	3.10	3.10	*2.75@ 3.00*
Ind. 4th Vein screenings	Chicago	2.15	2.10	2.10	2.00@ 2.25
Ind. 5th Vein lump	Chicago	2.80	3.60	3.60	*3.25@ 3.50*
Ind. 5th Vein mine run	Chicago	2.35	2.60	2.60	2.50@ 2.75
Ind. 5th Vein screenings	Chicago	1.60	1.80	1.80	*1.25@ 1.50*
Standard lump	St. Louis	2.60	3.10	3.10	3.00@ 3.25
Standard mine run	St. Louis	1.85	2.25	2.25	2.25
Standard screenings	St. Louis	1.20	1.45	1.35	1.30@ 1.40
West Ky. lump	Louisville	2.45	3.35	3.35	*2.85@ 3.25*
West Ky. mine run	Louisville	1.85	2.20	2.05	*1.85@ 2.15*
West Ky. screenings	Louisville	1.65	1.85	1.85	*1.50@ 1.85*
West Ky. lump	Chicago	.....	3.60	3.60	*3.00@ 3.25*
West Ky. mine run	Chicago	.....	1.95	1.80	1.75@ 1.85
South and Southwest					
Big Seam lump	Birmingham	2.60	.....	.....	.....
Big Seam mine run	Birmingham	1.85	2.10	2.10	2.00@ 2.25
Big Seam (washed)	Birmingham	1.85	2.60	2.60	2.50@ 2.75
S. E. Ky. lump	Chicago	.....	4.60	4.60	4.50@ 4.75
S. E. Ky. mine run	Chicago	.....	2.85	2.85	2.75@ 3.00
S. E. Ky. lump	Louisville	2.35	5.00	5.00	4.50@ 5.50
S. E. Ky. mine run	Louisville	1.50	2.60	2.60	2.25@ 3.00
S. E. Ky. screenings	Louisville	1.35	2.20	2.20	2.00@ 2.40
S. E. Ky. lump	Cincinnati	2.25	4.75	3.75	3.50@ 4.00
S. E. Ky. mine run	Cincinnati	1.35	2.35	2.50	**2.50@ 3.00**
S. E. Ky. screenings	Cincinnati	1.30	2.10	2.15	**2.00@ 2.50**
Kansas lump	Kansas City	5.00	5.00	5.00	*4.50*
Kansas mine run	Kansas City	4.00	3.50	3.50	3.50
Kansas screenings	Kansas City	2.50	2.50	2.60	2.50@ 2.75

* Gross tons, f.o.b. vessel, Hampton Roads.
† Advances over previous week shown in **heavy type**, declines in *italics*.

Current Quotations—Spot Prices, Anthracite—Gross Tons, F.O.B. Mines

	Market Quoted	Freight Rates	Latest Independent	Latest Pre-Strike Company	March 3, 1923 Independent	March 3, 1923 Company	March 10, 1923† Independent	March 10, 1923† Company
Broken	New York	$2.34	.....	$7.60@$7.75	$9.00	$7.75@$8.25	$9.00	$7.75@$8.25
Broken	Philadelphia	2.39	$7.00@$7.50	7.75@ 7.85	.....	7.90@ 8.10	.....	7.90@ 8.10
Egg	New York	2.34	7.60@ 7.75	7.60@ 7.85	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Egg	Philadelphia	2.39	7.25@ 7.75	7.75	9.25@11.00	8.10@ 8.35	9.25@11.00	8.10@ 8.35
Egg	Chicago*	5.09	7.50	8.25	12.00@12.50	7.20@ 8.25	12.00@12.50	7.20@ 8.25
Stove	New York	2.34	7.90@ 8.20	7.90@ 8.10	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Stove	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.25	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Stove	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.25	12.00@12.50	7.35@ 8.25
Chestnut	New York	2.34	7.90@ 8.20	7.90@ 8.20	9.25@12.00	8.00@ 8.35	9.25@12.00	8.00@ 8.35
Chestnut	Philadelphia	2.39	7.85@ 8.10	8.05@ 8.15	9.25@11.00	8.15@ 8.35	9.25@11.00	8.15@ 8.35
Chestnut	Chicago*	5.09	7.75	8.25	12.00@12.50	7.35@ 8.35	12.00@12.50	7.35@ 8.35
Range	New York	2.34	.....	.....	.....	8.25	.....	8.25
Pea	New York	2.22	5.00@ 5.75	5.75@ 6.45	7.50@11.00	6.15@ 6.30	7.50@11.00	6.15@ 6.30
Pea	Philadelphia	2.14	5.50@ 6.00	6.10@ 6.25	7.00@ 9.00	6.15@ 6.20	7.00@ 9.00	6.15@ 6.20
Pea	Chicago*	4.79	6.00	6.25	7.00@ 8.00	5.49@ 6.03	7.00@ 8.00	5.49@ 6.03
Buckwheat No. 1	New York	2.22	2.75@ 3.00	3.50	4.50@ 5.00	4.00@ 4.10	*4.50@ 4.75*	4.00@ 4.10
Buckwheat No. 1	Philadelphia	2.14	2.75@ 3.25	3.50	4.00@ 5.00	4.00	4.00@ 5.00	4.00
Rice	New York	2.22	2.00@ 2.50	2.50	2.50@ 3.00	2.75@ 3.00	*2.25@ 3.00*	2.75@ 3.00
Rice	Philadelphia	2.14	2.00@ 2.50	2.50	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00	2.75@ 3.00
Barley	New York	2.22	1.50@ 1.85	1.50	1.50@ 2.00	1.50@ 2.00	*1.40@ 2.00*	1.50@ 2.00
Barley	Philadelphia	2.14	1.50@ 1.75	1.50	1.40@ 2.00	2.00	1.40@ 2.00	2.00
Birdseye	New York	2.22	.....	2.00@ 2.50	.....	2.10	.....	2.10

* Net tons, f.o.b. mines. † Advances over previous week shown in **heavy type**, declines in *italics*.



Coal Age Index 268, Week of March 12, 1923. Average spot price for same period $3.24. This diagram shows the relative, not the actual, prices on fourteen coals, representative of nearly 90 per cent of the bituminous output of the United States weighted first with respect to the proportions each of slack, prepared and run-of-mine normally shipped, and second, with respect to the tonnage of each normally produced. The average thus obtained was compared with the average for the twelve months ended June, 1914, as 100, after the manner adopted in the report on "Prices of Coal and Coke, 1913, 1918," published by the Geological Survey and the War Industries Board.

now shipping on consignment. Prices are weaker all along the line, and lump broke under $3 last week for the first time in months, while mine-run is quoted under $2. Car allotments show larger on a percentage basis as a result of railroads cutting back to June 10 and adding 10 per cent to the May loading records in alloting cars. However, for the first time in months there was a little surplus of cars on the Illinois Central lines in western Kentucky on Monday as a result of idleness on Sunday. For the month, as far as railroads have reported, the Illinois Central shows 46 per cent of cars supplied, while the Owensboro division of the L. & N. is improving with 33 per cent and the Henderson division shows 28 per cent.

Operators acknowledge that the outlook is not promising in view of the fact that no early movement in a big way is anticipated north.

Market Sags in Northwest, Too

About the only shortage that causes even a ripple in the Northwest is the lack of coke for local use in Milwaukee. While docks in that city are scraped clean, car-ferry deliveries have improved a little. During February 23,605 tons of anthracite arrived and 62,383 tons of bituminous. By rail there arrived a little anthracite and 79,184 tons of soft coal. Interior dealers, who have been ordering broadcast and getting nothing, are not worrying much any more. Lake traffic may open up within six weeks.

The dock men are now deeply engrossed in the campaign of showing the country they cannot continue to do business unless the Interstate Commerce Commission alters rates so as to give the docks a better shake as against all-rail coal from Illinois and Indiana.

Stormy weather and some industrial activity, which have held up the market for Utah coal, are no longer effective. Mines throughout the state are shutting down. A railroad ruling that no mine shall get cars so long as it has as many as 50 per cent no-bills on hand is indicative of the situation. The mild weather is having exactly the same effect in Colorado. Fully 50 per cent of the coal operations of the state are down just now. Circulars issued in Kansas City March 8 show a 50c. break on both Kansas lump and nut and on Arkansas lump and mine run.

Ohio Hears of Smokeless Price Cut

In Ohio steel interests are inclined to talk about contracts. Demand for smokeless slack coals have picked up. Reports have it that smokeless operators are going to reduce prices on April 1. The movement for high-volatile coals has stiffened both in price and in the tone of the market. The railways have cleaned up considerably and the movement through the gateway is much better.

While steam grades are holding fairly well in the Columbus market there was a slump in domestic sizes, due largely to higher temperatures and the fact that dealers are moving slowly in placing orders. Retail prices have weakened a little because of weather conditions. Buying of both mine-run and screenings is more active and there is little free coal of those varieties on the market. With car supply reduced to about 15 to 20 per cent of capacity, steam grades are not as plentiful as formerly. Railroads with their assigned cars are taking a large part of the steam production in certain districts. Embargoes are affecting sections of Michigan and Indiana as well as some parts of Ohio.

Eastern Ohio mines are operating at a little less than 40 per cent of capacity, due to car shortage and transportation difficulties. During the week ended March 3, these mines produced 305,000 tons of coal, or 52,000 tons more than during the previous week, which however, consisted of only five work days. Manufacturers stocks are small but there are no indications any difficulty will be experienced by this class of consumer in getting his coal as needed.

Car shortage throughout West Virginia is very pronounced. There was a slight increase in production in the Pocahontas and Tug River districts, as congestion in some sections was relieved. Smokeless coal is on a firmer basis as a result of export inquiries. Quotations for mine-run ranged from $3.75 to $4.25 per ton.

Producers of high-volatile coals in West Virginia are feeling more optimistic as a result of increased industrial activity in the Eastern market and look forward to further improvement.

In the Pittsburgh district car supply is hardly any better, but there is less complaint, operators finding that production is equal to requirements. There is no demand for domestic coal except from the territory normally tributary to the district. Consumption by public service companies, manufacturers and the steel industry is heavy.

Production in the Birmingham (Ala.) district is being maintained around 385,000 tons weekly and there has been an improvement in car supply. Bunker trade at the Gulf ports has been somewhat better and some coal has been exported to Cuba. There has been a falling off in demand for domestic coals due to warmer weather.

The demand for soft coal in Buffalo is quiet.

New England Market Takes Turn for Better

With practically no advance indications the soft coal market in New England took a turn for the better something more than a week ago. Influenced partly by continuing embargoes all-rail and by a somewhat better outlook for manufactured goods mill buyers have shown more interest in current quotations. There has developed a disposition to hedge on the course of the spring market and it is probable that the remainder of March will show heavier purchases than were expected.

Both Italian and English orders have materialized within

a week's time, and while there is a tendency to exaggerate the tonnage required it is a fact that cargoes are not only in process but steamers have already made their departure for Mediterranean ports. So recent is this feature that ships are passing each other on the high seas, some of them bound this way with English coal on commitments of thirty days ago while others are outward bound with American coal destined to British agents. This new foreign demand is particularly difficult to gage because inquiries find their way to so many brokers and tonnages are often multiplied tenfold.

To all this promise of spot business the Southern smokeless coals have reacted sharply. Medium to second-grade low-volatile that were a drug a few days ago at $6@$6.25 have sold within a day or two up to $7, while navy standard coals have risen to $7.25 per gross ton f.o.b. vessel.

At Providence, Boston and Portland rehandlers are in more or less distress over terminal delays. At Portland cargoes are being detained ten days or so awaiting berth, while at Boston and Providence there are instances where boats will not be discharged before the first week in April. Some of the congestion is due to railroad fuel from Welsh ports, but perhaps the bulk of the coal awaiting disposition results from the attempts of some of the agencies to force shipments on reluctant buyers. Where a fortnight or so ago there were reasonably large accumulations at Hampton Roads daily receipts are now being absorbed with little or no delay. If car-supply can be improved on the Virginia railroads there probably is little doubt now that a materially increased output can be taken care of.

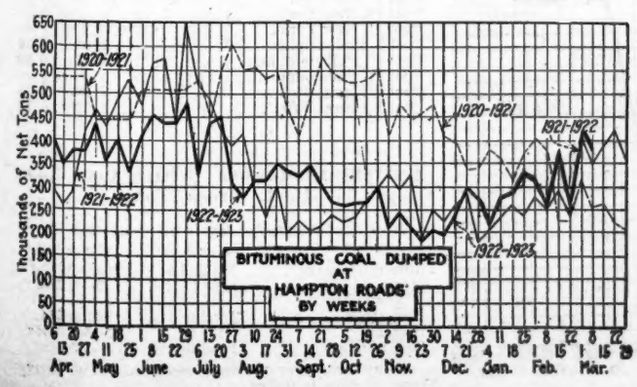
All-rail inquiry also has shown an improvement, although there has been no appreciable change in prices. In fact spot coal from central Pennsylvania was sold at a lower range than applied on December purchases for deliveries extended through February. The permit system is in use on the three chief New England carriers, especially on coal originating on the New York Central, but authority to ship is not difficult to obtain where moderate tonnages are involved, and the trade expects the gateway situation to improve measureably by April 1. Meanwhile many shippers are continuing their active canvass for contract business. Apparently they believe that taking the season as a whole it will be to their advantage to close a large proportion of anticipated output about on the basis of present spot prices. By the same logic the larger consumers here are less inclined to make contracts than to buy moderately in the present market.

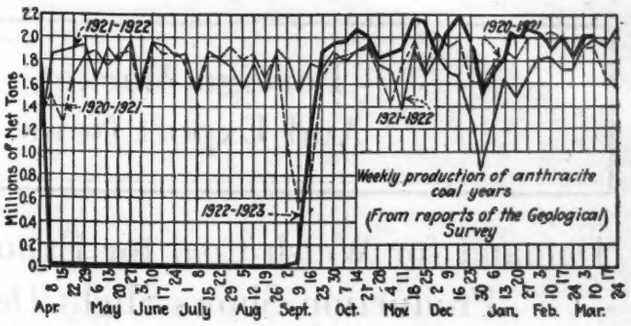
Market at New York Still Quiet

The New York market continues quiet, but most operators are optimistic. The better grades are sold up. Local houses are receiving many inquiries for foreign shipments for coal as well as for coke.

Conditions in the Philadelphia market show no change. Most consumers are buying to meet current requirements, but with active industrial conditions the actual consumption of coal is increasing.

There has been a gradual resumption of export movement at Baltimore. One steamer leaving Baltimore with 5,677 tons of Fairmont coal for Leghorn, Italy, had discharged Welsh coal at Boston. Another vessel that brought coal to Providence will load coal for Italy at the Western Maryland docks. There was a gradual growth in demand for bunker coal, with quotations for Pool 9 around $6.45 at the piers.





Domestic Anthracite Finds Ready Market

Domestic sizes of anthracite are finding a ready market. Consumers in New York territory are placing orders for next winter's supply and are telling their dealers to put the coal into their bins as soon as possible. Producers do not look for any let-up in demand this spring and summer, at least not until most consumers have put in their coal. Similar conditions exist in Philadelphia. In Baltimore, where dealers have not been able to deliver all of their orders, some consumers have cancelled parts of their orders, having sufficient deliveries to last them the balance of the season. Orders are being cut from various parts of the country. Some coal has been refused by dealers from Canada unless it is of high quality.

The production of anthracite in the week ended March 3, according to the Geological Survey, increased notably over the production in the week before and is estimated at 2,104,000 net tons, including coal shipped, mine fuel, local sales and dredge and washery output.

Early returns on car loadings during the first four days of the week March 5-10 indicate somewhat lower rate of production and a probable total output for the week of approximately 2,000,000 tons.

How the Coal Fields Are Working

Percentages of full-time operation of bituminous coal mines, by fields, as reported by the U. S. Geological Survey in Table V of the Weekly Report.

	Jan. 1 to Apr. 1, 1922 Inclusive	Sept. 5 to Dec. 30, 1922 Inclusive	Jan. 1 to Feb. 24, 1923 Inclusive	Week Ended Feb. 24, 1923
U. S. Total	55.7	....	....	....
Alabama	64.6	84.7	89.0	(a)
Somerset County	74.9	36.3	28.2	19.5
Panhandle, W. Va.	51.3	57.3	55.9	55.8
Westmoreland	58.8	65.8	54.8	41.0
Virginia	59.9	55.7	52.4	51.1
Harlan	54.8	22.1	21.4	16.2
Hazard	58.4	16.4	18.8	14.9
Pocahontas	60.0	36.6	35.6	26.7
Tug River	63.7	28.8	32.6	29.3
Logan	61.1	26.2	30.9	32.1
Cumberland-Piedmont	50.6	31.7	44.4	45.8
Winding Gulf	64.3	30.4	32.4	33.4
Kenova-Thacker	54.3	42.4	38.6	(a)
N. E. Kentucky	47.7	28.4	28.5	25.8
New River	37.9	31.6	34.2	31.1
Oklahoma	59.6	59.1	42.2	38.8
Iowa	78.4	75.9	80.2	80.9
Ohio, Eastern	46.6	40.8	33.8	31.7
Missouri	66.8	76.3	76.4	78.2
Illinois	54.5	49.9	52.1	51.5
Kansas	54.9	55.9	50.5	41.9
Indiana	53.8	37.7	55.0	59.1
Pittsburgh†	39.8	41.2	32.5	32.7
Central Pennsylvania	50.2	53.4	43.1	44.6
Fairmont	44.0	35.5	35.7	32.5
Western Kentucky	37.7	32.4	33.8	32.4
Pittsburgh*	31.9	56.1	63.5	52.6
Kanawha	13.0	15.6	21.5	20.8
Ohio, Southern	24.3	38.1	36.2	30.5

* Rail and river mines combined.
† Rail mines.
(a) No report.

Car Loadings, Surplusages and Shortages

	Cars Loaded All Cars	Cars Loaded Coal Cars
Week ended Feb. 24, 1923	830,778	178,457
Previous week	817,778	180,988
Same week in 1922	728,925	186,640

	Surplus Cars All Cars	Surplus Cars Coal Cars	Car Shortage	
Feb. 21, 1923	20,786	5,322	76,900	39,197
Feb. 14, 1923	27,172	7,094	72,855	38,132
Same date in 1922	264,814	105,570	.....	.....

Foreign Market And Export News

Demand for Welsh Coal for Export Increases; Production Shows Slight Decrease

There was a further drop in British coal production during the week ended Feb. 24, according to a cable received by *Coal Age*. The output amounted to 5,519,000 tons, as compared with 5,560,000 tons the previous week. This is the fifth consecutive week in which production has shown a decline.

Demand upon the South Wales operators is increasing and they are heavily booked for March and April deliveries. It is reported that the German State Railways are inviting offers of any quantity of Northumberland and Durham coals for delivery at stated periods throughout the year.

There was a heavy demand for coke and coking smalls from Germany, as well as from France, Italy and Belgium.

The negotiations for the three-shift day at the docks have been broken off and the coal exporters, dock owners and others interested have asked the Industrial Court to make an inquiry.

German buyers are buying heavily in the North of England market, at prices quoted for late March and April delivery. Belgium, France and Italy also are making inquiries.

Within the past few weeks there have been strikes in various parts of South Wales over the non-unionist question, affecting several thousand men in the aggregate.

Hampton Roads Market Brisk

Business was more brisk at Hampton Roads, with prices stiffening and with a considerable volume of coal for export moving for the first time in many months. One steamer loaded coal for Germany.

Coastwise business was better, also, and supplies at the piers were being cut down materially. The eyes of the trade turned to the export field, speculating on the outcome of the German situation which is promising much business.

The tone of the market was stronger than for many weeks, and coal moved on a better schedule from the mines. The general outlook was much brighter and a better feeling throughout the trade resulted.

French Miners Get Wage Increase

Except in Lorraine and in the Saar, where the present agitation is partly due to influences from Berlin, the strikes which broke out on Feb. 16 in various French coal fields are now ended. The miners obtained the following wage increases per shift:

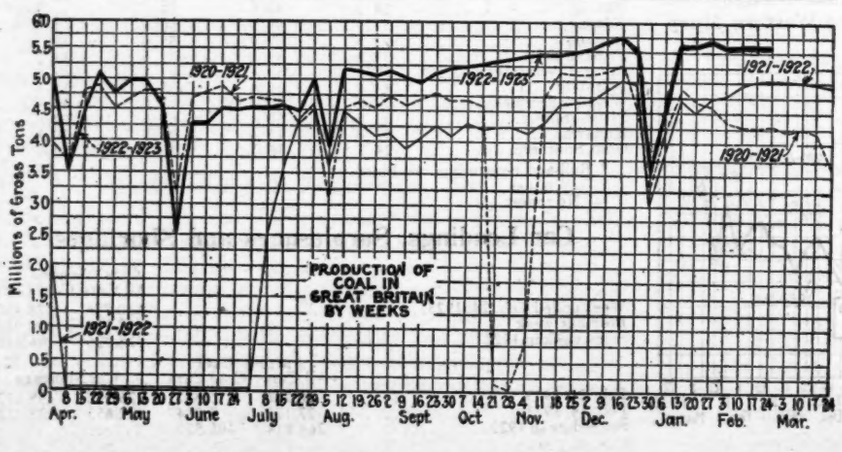
Nord and Pas-de-Calais	3 fr., 25
Loire	3 fr.
Aveyron (Decazeville)	3 fr.
Blanzy colliery	2 fr., 50
Gard	2 fr., 50

On the whole, the wages of French coal miners are brought back to their record level of 1921.

Pending the publication of their new schedules for renewal of annual contracts, the bulk of which start from April 1, collieries of the Nord and Pas-de-Calais have raised by 7 to 10 frs. prices to be applied to isolated orders or to contracts renewed before the end of March.

The interruption of shipments from the Ruhr, as well as the strikes in the Saar and in Lorraine, have taken away from the French market about one million tons per month.

French blast-furnaces, especially those of the East of France, are in a bad way as regards coke supplies. From Feb. 12 to Feb. 20, they received only 6,400 tons of coke from the Ruhr. Shipments of Belgian coke are being suspended pending the conclusion of an agreement relative to exchange shipments of French iron scrap to Belgium. British coke can of course be obtained, but in insufficient supplies and at excessive prices. As to French coke ovens of the Nord and Pas-de-Calais, they are now producing coke at the rate of about 70,000 tons only per month.



United States Coal Exports

(In Gross Tons)

	Anthracite	Bituminous
April	109,290	714,993
May	60,860	399,511
June	40,284	540,550
July	16,698	366,287
August	28,704	425,530
September	88,688	1,175,007
October	404,999	1,729,425
November	440,608	1,518,077
December	381,758	1,468,917
1923		
January	355,272	1,090,439
Total for ten months, April, 1922, to January, 1923	1,927,161	9,528,738
Total for corresponding period ending with January, 1922	3,511,031	16,637,782

Export Clearances, Week Ended Mar. 3,

FROM HAMPTON ROADS

	Tons
For Canada:	
Nor. S.S. Erholm Johannessen, for St. Johns	1,596
For Cuba:	
Du SS. Trompenburg, for Havana	2,858
Dan. SS. Sarmatia, for Havana	1,596
For Egypt:	
Dan. SS. Brandeong, for Port Said	2,498
For Holland:	
Br. SS. Stephen, for Rotterdam	6,295
For Italy:	
Ital. SS. Vallarsa, for Porto Ferrajo	6,930
For West Indies:	
Amer. Schr. James E. Coburn, for St. Georges	1,383
Nor. SS. Bratland, for Curacao	2,969
Nor. SS. Mons, for Kingston	2,860
Amer. SS. Lake Galisteo, for Port of Spain	3,727

FROM PHILADELPHIA

For Cuba:	
Dan. SS. Sarmatia, for Havana	—
For Italy:	
Ital. Bark Santa Caterine, for Naples or Genoa	—

Hampton Roads Pier Situation

N. & W. piers, Lamberts Pt.	March 1	March 8
Cars on hand	962	823
Tons on hand	61,183	57,801
Tons dumped for week	151,121	124,126
Tonnage waiting	14,300	19,000
Virginian Ry. piers, Sewalls Pt.		
Cars on hand	1,428	1,209
Tons on hand	82,830	70,370
Tons dumped for week	132,174	130,715
Tonnage waiting	30,282	11,315
C. & O. piers, Newport News		
Cars on hand	591	864
Tons on hand	70,055	60,650
Tons dumped for week	92,070	94,483
Tonnage waiting	5,253	18,745

Pier and Bunker Prices, Gross Tons

PIERS

	March 3	March 10†
Pool 9, New York	$7.25@$7.50	*$7.00@$7.50*
Pool 10, New York	6.25@ 6.75	*6.15@ 6.50*
Pool 11, New York	5.50@ 5.75	*5.00@ 5.70*
Pool, 9, Philadelphia	6.90@ 7.10	*7.00@ 7.20*
Pool 10, Philadelphia	6.30@ 6.55	6.30@ 6.55
Pool 11, Philadelphia	5.70@ 5.90	*5.50@ 5.80*
Pool 1, Hamp. Roads	6.40	**7.00@ 7.25**
Pools 5-6-7 Hamp. Rds.	5.75	**6.50@ 6.75**
Pool 2, Hamp. Rds.	6.40	**7.00@ 7.25**

BUNKERS

Pool 9, New York	$7.60@$7.85	*$7.50@$7.80*
Pool 10, New York	6.60@ 7.10	*6.45@ 6.80*
Pool 11, New York	5.85@ 6.10	*5.30@ 6.05*
Pool 9, Philadelphia	7.10@ 7.35	**7.25@ 7.50**
Pool 10, Philadelphia	6.65@ 6.75	**6.60@ 6.90**
Pool 11, Philadelphia	5.80@ 6.25	*5.75@ 6.15*
Pool 1, Hamp. Rds.	6.50	**7.00@ 7.25**
Pool 2, Hamp. Rds.	5.75	**6.50@ 6.75**

Current Quotations British Coal f.o.b. Port, Gross Tons

Quotations, by Cable to Coal Age

	March 3	March 10†
Admiralty, large	30s.@32s.	30s.@32s.6d.
Steam, smalls	23s.@23s.6d.	**23s.@25s.**
Newcastle:		
Best steams	32s.6d.@34s.	**33s.@34s.**
Best gas	32s.6d.	**32s.6d.@35s.**
Best bunkers	32s.6d.@35s.	*30s.@32s.6d.*

† Advances over previous week shown in heavy type; declines in *italics*.

News Items From Field and Trade

ALABAMA

The Kewanee Coal Co. at Jasper has been incorporated by W. G. Duffee, J. R. Smith and A. K. Smith.

CALIFORNIA

The Chicago Pneumatic Tool Co., New York, announces the appointment of **H. J. Bradley** as San Francisco branch manager succeeding J. K. Haigh, who has been transferred to the Chicago branch to resume sales work.

COLORADO

The Colorado Fuel & Iron Co. reports for the year ended Dec. 31 last **net earnings of $3,261,327**, compared with $1,773,505 in 1921, and a deficit after depreciation, taxes, etc., of $654,944, against $2,371,171 in the previous year. J. F. Welborn, president, says that the coal strike did not adversely affect business, the average coal production during the strike period being several thousand tons in excess of the monthly average for the year.

CONNECTICUT

Governor Templeton has announced that, immediately following the adjournment of the Legislature, he **will invite the Governors of all the New England states and Pennsylvania to a conference** in Hartford to prepare for a possible repetition of the coal emergency next winter.

ILLINOIS

The Central Illinois Traffic Bureau, with offices in Chicago, is to be continued and **W. H. Holley**, manager for three years until last winter, when he joined the Nason Coal Co. at Chicago, returns to the bureau. **George Hemphill**, who has been temporarily in charge of the bureau, remains in his former capacity as Mr. Holley's right-hand man.

Between 60 and 90 tons of coal is being mined daily from the new Shuler mine near Alpha. There are 13 miners at work in the mine and as soon as the mine is enlarged the force will be increased. The Burlington R.R. has completed the switch to the mine, but the owners of the mine have not laid the track up the mine, so that coal is being transported from the mine by wagon and truck.

Is the Peabody Coal Co. of Chicago going to acquire and operate a section of the old **Chicago, Peoria & St. Louis Ry.?** The report gained circulation late in February when Stuyvesant Peabody, president of the Peabody Coal Co., inspected part of the line with engineers. "Not a word to say," was his only comment after he returned to Chicago. W. C. Hurst, general manager of the railroad said in Springfield that no offer had been made for any part of the road and that this was not the first time the Peabody interests had looked over the property. The railroad company has been petitioning the State Commerce Commission and the I. C. C. for permission to dispose of the line. That part of the railroad from Pekin south and east to Springfield makes junctions with the Illinois Central, Chicago & Alton, Chicago & Northwestern and the Burlington railroads and might be of some value as a coal originating line for a coal company with operations on it. The line now serves five mines jointly with other roads and four mines exclusively. Mr. Peabody denies that his company has bought any more mines on the line. It now operates its No. 51 mine at Andrews on the C. P. & St. L.

Frank W. DeWolf, who has been chief of the Illinois State Geological Survey at the University of Illinois, Urbana, announced his resignation Feb. 28 to engage in commercial work with The Humphreys-Gohs Oil Co., with headquarters at Dallas, Tex. Mr. DeWolf has been with the Illinois State Geological Survey since 1907 and has been in administrative charge since 1909. During this time, the most important investigations carried on by the Survey have dealt with coal and oil possibilities of Illinois. Mr. DeWolf is especially well known in mining circles in Illinois and the Central West.

Consolidation of ownership of the three Franco coal mines in Williamson County, near Marion, with capitalization at $1,500,000 has been announced by R. B. Mitchell, of Marion, vice-president and general manager of the new corporation, known as the Cosgrove Meehan Coal Co., of Illinois. Franco Nos. 1 and 2 were owned by the Ernest Coal Co. and Franco No. 3 by the Sandford Coal Co., both Cosgrove interests centering in Johnstown, Pa.

Reports are that the **Big Four railroad is to build an extension** out of Harrisburg towards West Frankfort, tapping a large section of Franklin County and its many mining centers. It is to be known as the Saline Valley Ry. and acording to reports the right of way has been acquired and work is to be started soon on the project. The proposed extension for a few miles will run parallel to the proposed Illinois Central branch which is now practicailly assured.

Despite adverse working conditions in January the Coal Operators' Association of the Fifth and Ninth Districts of Illinois, embracing 83 mines in the southern part of Illinois, report that the **output that month was greater than either November or December**, the total for the month reaching 1,770,879 tons. In December the tonnage was 1,589,619 and in November the production was 1,404,637 tons. The report for the week ending Feb. 3, shows a slackening of production with 329,297 tons hoisted, or 50,000 tons less than in the preceding week. Time worked dropped from 49 per cent of potential hours to 45 per cent. Hours lost because railroad cars were not available showed a considerable increase, and amounted to a greater number of hours than were actually put in by the miners.

R. B. Starek has been appointed executive vice-president of the **Binkley Coal Co.**, which recently purchased the properties of the W. S. Bogle Coal Co., of Chicago. H. A. Stark, former president and general manager of W. S. Bogle & Co., has been named vice-president and general manager. The company has also taken over the Essanbee Mining Co., of Clinton, Ind. The reorganization gives the Binkley company a total of 5,000 acres of coal land and an estimated output of 8,000 tons a day. W. H. Baker has charge of the Chicago sales, while Mr. Stark is in charge of all mine operations as general superintendent, with offices at Clinton, Ind.

INDIANA

The Love Coal Co. has been organized at Anderson, to mine coal. The company has a capital stock of $50,000 and the directors are Eldra O. Love, E. C. Love and L. B. DeSanctis.

The Penna, a new mine of the Templeton Coal Co., Terre Haute, located on the C. M. & St.. P. R.R., was opened Nov. 27, 1922.

The Eagle, a new mine operated by the Eagle Coal & Mining Co., Terre Haute, located on the C. & E. I. R.R., was opened Aug. 31, 1922.

The City Mine, of the City Coal Co., Jasonville, on the C. M. & St. P. R.R., was opened on Oct. 9, 1922.

More than 4,000 miners in the Terre Haute district went on vacation recently and more than twenty mines located north of that city were idle. The cause, it is said, is that the C. M. & St. P. R.R. did not send a train to the Bardyke mine the day previous, when a breakdown occurred, and no means were provided to return the men to their homes until the regular evening miner trains. In the meantime while the miners punish the railroad by not riding trains, the operators are doing repair work.

Dealers and operators of the Brazil block coal field, officially known as District No. 8, reached an agreement at a meeting recently for a continuance of the present wage contract after April 1. The contract is based on the New York agreement for soft-coal mining, but as the block coal is mined under different conditions, a separate scale is made for the Brazil district, providing a differential in favor of the block coal miners.

The Supreme Court of Indiana has ruled that coal operators need not pay employees twice a month and in cash. Numerous cases where payrolls were stolen were cited in argument against the proposed law.

IOWA

The Independent Coal Co. of Burlington has been incorporated with capital of $10,000 by A. G. Ruge and John McMahon.

KANSAS

Mine No. 11 of the Oberzan Coal Co., Mineral, located in Cherokee County on the M. K. & T. R.R., which was closed Sept. 30, 1921, was reopened in July, 1922.

The Old Smith mine, operated by George Dixon and others, of Mineral, located in Cherokee County, which was closed a number of years ago, was reopened in September, 1922. This was formerly connected with the M. K. & T. Railroad and it is the intention of the new company to re-lay the switch.

Mine No. 20 of the Sheridan Coal Co., Mulberry, located in Crawford County, is now being developed. A railroad switch has not been laid yet, but connections will be made with either the Missouri Pacific or the Kansas City Southern, or both.

Mine No. 3 of the McGrath Coal Co., of Pittsburg, in Crawford County on the Frisco R.R., a new operation, is now being developed.

Mine No. 11 of the Graham Coal Co., Pittsburg, located in Crawford County on the Santa Fe R.R., which was closed on Sept. 30, 1921, reopened Aug. 20, 1922.

KENTUCKY

A group of Luisa capitalists, headed by T. B. Lane and M. F. Conley, have formed the **Coalburg Collieries Co.** with a capital of $20,000, and with headquarters at Lawrence, where coal properties will be developed.

The Red Top Coal Co., of Lexington, has announced that it will establish a plant for the manufacture of smokeless blasting powder and that the new plant will be conducted in conjunction with its coal-mining operations.

The Midland Mining Co., of Tribbey, has announced a program of improvement, including the construction of a new tipple, mining houses and the like.

New coal companies which have filed for incorporation at Louisville are these: **Liberty Coal & Coke Co.** with a capital stock of $50,000, of 500 shares, A. R. Anderson holds 50; R. R. Atkins, 50; M. S. B. Barker, 134; A. G. Stith, 133, and T. H. Helm, 133. Limit of debt, $250,000. **L. X. L. Coal and Mining Co.**, Bell; $25,000; M. D. Bell, E. R. Martin and J. E. Bell, all of Pineville. **White Elkhorn Mining Co.**, Letchner; $25,000; Thomas Fugate and J. W. Craft, Hazard, and H. A. Price, Detroit, Mich.

The Oak Ridge Coal Co. has been incorporated at Louisville, with a capital of $50,000. The incorporators are R. Montgomery and J. L. Morris, both of Louisville, and W. R. Hudspeth, of Greenville.

The Virginia Coal & Coke Corporation, with main offices at Roanoke, Va., has leased acreage in the Elkhorn and Hazard fields of eastern Kentucky, near Whiteburg, which it will develop.

The Blackwell mine of the Blackwell Bros. Coal Co., at Powderly, on the Illinois Central Ry., was reopened on Dec. 20, 1922.

The Pond Creek mine of the Pond Creek Coal Co., Central City, on the Kentucky Midland R.R., was opened on Sept. 15, 1922.

The Nonnel mine of the Kentucky Washed Coal Co., Greenville, a strip mine, located on the Louisville & Nashville R.R., was reopened on Dec. 10, 1922.

The No. 3 mine of the Black Diamond Coal Co., Drakesboro, on the Louisville & Nashville R.R., was opened Sept. 15, 1922.

The Lelia mine of the Liberty Coal Mining Co., at Hillside, on the Illinois Central R.R., was reopened Sept. 1, 1922.

In order to relieve congestion in the Louisville terminals the **Louisville & Nashville R.R. has started work on new yards** at Highland Park, where trackage for 1,000 cars will be installed at once, with plans for later materially enlarging switching facilities. More than a year ago the company purchased 463 acres adjoining the present yards on the south.

Jacob Hetzel, M. F. Patrick and D. Glenn Sublett have incorporated the **Laurel Fork Coal Co.** at Salyersville.

A. B. Culton, of the firm of Culton & Sherwin, mining engineers, Pineville, has been **appointed to head the L. & N. rating commission** with offices in Louisville. For the present he will continue to reside in Pineville. The firm of Culton & Sherwin will continue as heretofore with Mr. Culton in a consulting capacity.

Robert Jameson, Earl Jameson and Beatrice Jameson have incorporated the **Edythe Coal Co.**, at Beattyville, Ky., with a capital stock of $20,000.

The Smothers-Gooch Coal Co., at Pineville, has been organized with the election of the following officers: President and manager, Estill A. Smothers; secretary, treasurer and construction engineer, C. L. Gooch. The company was recently incorporated for $10,000. The company plans to install a bucket system at a cost of $15,000 and will develop 300 acres of coal land with a daily capacity of five cars. Purchase of the mining equipment needed is to be made soon.

Patrick Calhoun, president of the Inland Waterways Co., Louisville, declares that by **next winter large quantities of coal will be moving into Louisville by water** from the Kentucky River section of eastern Kentucky and from the Kanawha river section of West Virginia, the company having arranged to go ahead with installation of barge unloading equipment at the old Consolidated Coal Co. yard in Portland, Louisville, where an incline and other equipment will be installed for mechanically transferring coal from barges to yards and to railroad cars for distribution about the city and to other points on a combination water and rail haul. The company is now operating several towboats and barges and is having additional equipment built for its use.

The Kentucky Utilities Co., Louisville, an Insull organization, operating great transmission lines in both the eastern and western Kentucky fields and utilities in various sections of the state, at its annual meeting in Louisville on Feb. 27, **re-elected directors and officers.** Samuel Insull is chairman of the board, Harry Reid, president; L. B. Herrington vice-president; and A. A. Tuttle, secretary. The report showed an increase of surplus from $272,108 to $400,429 for the year. During that period the company completed 121 miles of additional transmission lines in the coal fields, and now has 504 miles of such line in service. Plans call for additional generating capacity for eastern Kentucky to take care of increasing demand from the coal operations. It is believed this demand will become much greater as the Louisville & Nashville R.R. carries out its plans for spending large sums in improving service to the coal fields of southeastern Kentucky.

MINNESOTA

The bill proposed before the Minnesota legislature to sell coal on the basis of heat units, by a system of grading, **has been dropped.** The bill was based upon a proposition from Fuel Commissioner Bowen.

Judge McGee, of Federal Fuel Administrator fame in Minnesota, **has been named for a federal judge in this state** and the nomination has been confirmed in the Senate. As Fuel Administrator the Judge antagonized many, but he had many friends who have been pushing him for this position.

MISSOURI

A coal mine has been opened on the Luys' farb, east of Carthage, and is being operated by H. C. Campbell, D. W. Short and M. Branson, of Purcell. Several tons of coal already have been taken out and operations will be pushed. The shaft was sunk about a year ago but little mining has been done since that time. The mine seems to be in the heart of a coal bed.

George McGuire and James Holman, who have been in charge of a coal mine at Vibbar, Mo., have **leased 40 acres near Chillicothe**, and have brought equipment to open a new shaft. The mine is to be tunneled into the side of a hill. McGuire and Holman report they have 25 experienced miners they will bring here as soon as the shaft is ready.

C. C. Carpenter, of Trenton, who has just returned from Worcland, reports that **27 coal mines have been opened in the vicinity of Worcland** recently. The mines are strip mines and the coal is shipped direct to Kansas City. According to Carpenter the payroll of the mines in one month amounted to $100,000 and, because of the shortage of houses, there were 100 tents in the town before the cold weather set in.

NEW YORK

Assemblyman Coughlin, of Kings County, has offered a resolution to the State Assembly at Albany **calling on the federal government to operate the mines and distribute coal.** Mr. Coughlin maintains that the fuel shortage this winter was due in large measure to the absence of unified action and co-operation between the mines and the railroads.

The city **water works of Buffalo** has asked for bids on **furnishing 45,000 tons of "three-quarter slack" coal,** tenders to be opened March 20.

A pure coal bill was introduced in the State Senate at Albany March 5 by Senator Ryan, of Rensselaer. Under its provisions it would be a misdemeanor for any person, firm or corporation to sell or offer for sale as coal any fuel mixed with coke, charcoal, slag, limestone or slate, unless the purchaser was notified in advance of the adulteration.

The Perryman-Burns Coal Co., Inc., has been organized to deal in anthracite and bituminous coals, with offices at 90 West Street, New York City. David P. Burns, and his brother Archibald P. Burns, both formerly connected with the Tuttle-Burger Coal Co., are members of the new concern. Archibald P. Burns, who covered the New Jersey territory for the Tuttle-Burger company, will represent the new concern in that state.

Koppers coke ovens, arranged in two batteries of 57 ovens each, together with byproduct and benzol plants, coal- and coke-handling equipment, etc., **are to be built at the Lackawanna plant (at Buffalo) of the Bethlehem Steel Co.** Construction will be started at once and it is expected that the plant will be completed within a year.

OHIO

The Besola Coal Co., St. Clairsville, has been chartered with a capital of $25,000, to mine and sell coal, by W. E. Lahm, J. O. Somers, B. H. Beatty, Laura L. Somers and Emma C. Beatty.

The Middle West Coal Co., of Cincinnati, has announced the appointment of **Burke H. Keeney**, as manager and treasurer to succeed E. H. Doyle.

The property of the **Caledonian Coal Co.**, of Columbus, consisting of 385 acres and an operating mine on the T. & O. C. R.R., south of New Lexington, **has been sold to D. J. Malone**, of Fort Smith, Ark. The consideration was in the neighborhood of $168,000.

The Romaine Coal Co. has been chartered with an authorized capital of $350,000 to mine and sell coal in Jefferson County. Incorporators are Fred H. Clark, Frank R. McGee, M. B. Cole, A. B. Imhoff and J. S. Butts.

H. W. Hawk, head of the Long Hollow Coal Co., of Nelsonville, has returned from Pittsburgh, where he closed a deal for the purchase from the National Fireproofing Co. of a large acreage adjoining his property. This will be used to enlarge his mine and modern equipment will be installed, including shaker screens. The mine will be electrically equipped.

S. H. Robbins, president of the Youghiogheny & Ohio Coal Co., has been appointed chairman of the board of directors and **acting president of the Midland Bank**, Cleveland, until such time as a successor to William P. Sharer is named. Mr. Robbins also is president of the Northern Coal & Dock Co. and the Progress Coal Co. He also is a director of the Big Vein Coal Co.

The Piney Fork Coal Co., a subsidiary of the Hisylvania Coal Co., of Columbus, which was opened several years ago as a stripping operation, **has been converted to a drift-mining proposition,** as all of the coal that could be mined by stripping has been taken.

At the Canton and Columbus plants of the Timken Roller Bearing Co. provision is being made for a **considerable increase in production** of Timken tapered roller bearings. At the Canton plant a large modern factory building is in process of construction, on which work is being rushed to completion as rapidly as possible.

PENNSYLVANIA

A per capita tax of 50c. is being levied against the members of those unions which have not contributed **toward the memorial to be erected to John Mitchell**, former president of the United Mine Workers of America. The memorial is to be erected in Scranton to commemorate the unionizing of the hard-coal fields by Mr. Mitchell.

A meeting of the tri-district executive board of the Districts 1, 7 and 9 of the United Mine Workers of America **will soon be called to determine the new policy of the union** in the anthracite field in the coming negotiations with the mine owners. Two courses are said to be open to the men, one the calling of a tri-district convention to frame new demands and the other a referendum vote to have the members indorse a renewal of the demands as framed at the Shamokin convention in January, 1922.

A new mine-cave bill was introduced in the State Legislature on March 6 by Representative Walter W. Kohler of Lackawanna County. The bill provides that any persons, association, copartnership or corporation owning land in any districts in which anthracite or bituminous coal mining has been carried on may send into the mine openings competent mining engineers, agents or inspectors for the purpose of ascertaining to what extent and where and how much coal has been mined from beneath the property of the complainant. It is further provided that the owners or operators of the mine, their agents and employees shall be obliged to render such aid to the investigators as will enable them to make the examination with safety to themselves. Refusal of the owners or operators for a period of ten days after the demand to enter the mine has been made is interpreted by the provisions of the bill as a misdemeanor and upon conviction for this they shall be sentenced to pay a fine not to exceed $10,000. **Representative Kohler also introduced a bill** providing that in all cases where a right to recover damages for injuries to persons or property caused by the subsiding or caving in of the ground covering any mine or excavation the statute of limitations shall begin to run against such right of action from the time of the cave-in.

Augustus McDade, mine inspector of the **Seventh anthracite district**, reports 13 fatal accidents and 18 non-fatal accidents in that district during 1922, while **1,595,942 tons of coal were mined.** Of the coal mined 1,455,746 tons was shipped to market. In the **Thirteenth anthracite district 2,511,550 tons of coal was mined during 1922**, according to the report of Mine Inspector Frank Kettle, and that 2,511,550 tons was sent to market. There were 24 fatal accidents in the mines of the district, of which all but one occurred inside the mines. Richard Maize, Mine Inspector for the **Fifth bituminous district reports 4,203,256 tons of coal and 1,225,028 tons of coke** produced in that district during 1922. There were 12 fatal accidents inside the mines and three outside. The H. C. Frick Coke Co., the largest producer in the district, led with a total output of 2,069,863 tons. There were **4,230,024 tons of coal produced in the 20th bituminous district** in 1922, says Mine Inspector Fletcher W. Cunningham in his annual report. This was 57,882 tons more than in the previous year. Mine Inspector Nicholas Evans, of the **24th bituminous district**, reports that **3,700,193 tons of coal was produced** in that district during 1922, of which 3,600,086 tons went to market. The 1922 tonnage was about 65 per cent of the 1921 tonnage. The report of Harry Phythyon, mine inspector of the **27th bituminous district**, shows **production of coal in 1922** to have been **3,004,317 tons.**

The Fowler bill repealing the state anthracite coal tax law of 1921 has been amended to provide that the repeal shall not take effect until Jan. 1, 1925. When the bill was reached on the third-reading calendar March 6, its sponsor, Representative David Fowler, Lackawanna County, **moved that it be postponed for the present.**

In a letter to W. Clyde Harer, a Representative from Lycoming County and chairman of the House Appropriations Committee, on March 5, **Governor Pinchot suggested a giant power system** based on the principles of quantity production through utilization of the water power of the state and the power that can be generated through steam. He suggested the location of the steam stations near the coal mines and the use in them and in gas works of the by-products of coal now wasted. He asked the appropriations chairman for $35,000 with which to have a comprehensive survey made.

Attorney J. Hayden Oliver, Glen Alden Coal Co. (chairman), W. L. Allen, Scranton Coal Co.; Charles Dorrance, Hudson Coal Co.; W. A. May, Pennsylvania Coal Co., and M. J. Martin, who it was announced will represent various companies, have been chosen to represent the coal companies operating in Scranton and vicinity that will meet a committee representing the city and civic organizations to discuss **remedial mine-cave legislation.** The committee consists of fifteen members, ten representing the city and its organizations and five the coal companies.

Governor Pinchot on March 7 informed a delegation of Scranton citizens interested in the repeal of the anthracite coal tax that he was **opposed to the repeal.** He said that the state needed the money and that four-fifths of the tax was paid by residents outside the state.

The Board of Directors of the **Lehigh Valley Coal Sales Co. have declared a dividend of $2** per share payable April 2, 1923, to those stockholders of the company who are holders of full share certificates of stock, registered on the company's books at the close of business March 15, 1923.

The Pittsburgh Coal Co. report for 1922, just issued, shows an **output for the year of 6,612,717 net tons,** of which 5,452,255 was

produced and 1,160,462 tons purchased, a decrease from 1921 of 2,343,845 tons, or 26 per cent. For this, of course, the strike was responsible. The net earnings for the year, after full charges for interest, depletion and depreciation, but before deducting Federal income tax, were $3,714,952.84. After payment of dividends and 1921 taxes the surplus on Dec. 31, 1922, was $2,932,714.22, an increase of $148,822.56 for the year. Full quarterly dividend payments for the year were declared on preferred stock and 3½ per cent was paid on common stock. Employees own 10,444 shares of preferred stock and 11,401 shares of common. Acreage exhausted in 1922 was 666, leaving unmined reserves owned of 164,351 acres and under lease 634 acres.

Dever C. Ashmead, associate editor of *Coal Age*, gave an **illustrated talk on "The Mining and Preparation of Anthracite"** at a meeting of Wilkes-Barre Rotary, Tuesday, March 13. James Purdue, a mining engineer, assisted in the presentation of the subject.

The administration is reported to be planning a tax on bituminous coal. What effect such a measure will have on the move to repeal the anthracite tax measure is a matter of speculation. The need for addition revenue is becoming more and more apparent, if the present educational program is to be carried out.

TENNESEE

Officials of the United Mine Workers of America in District No. 19 have annouced that **more than a hundred mines in southwestern Kentucky and Tennessee have signed wage agreements** with their men by which the 1920 wage, based on the Central Competitive Field agreement, is to be continued in force until April, 1924. The agreement will affect 8,000 miners, the union officials declare. The production of coal in Tennessee during 1922 totaled 4,350,000 net tons, valued at $15,000,000. O. P. Pilam, state mine inspector, declares that the 1922 production was the lowest in efficiency in the history of the state. There were 13,500 miners employed, compared with 10,653 in 1921, and the production was about equal to 1921, but less than 1920 when 6,921,848 tons were produced.

The Pocahontas & Sewanee Coal & Iron Co., of Pikeville, has the development of 1,900 acres of coal land under way and this will have a 2,000-ton capacity. The company is planning to install electrical equipment and machinery.

UTAH

The I. C. C. has given permission for the **construction of the Utah Central Railroad's line in the coal-producing sections of the state.** The line will be about 50 miles long, with main and side tracks, and will tap the Denver & Rio Grande Western R.R.'s main line near Castlegate and extend southeast through Carbon County into the northeastern section of Emery County, terminating in Huntington Canyon, where the principal mines it is intended to develop are located. The company holds thousands of acres of coal land on patents and also leased government land. Several of the mines have already been developed to a limited extent as wagon mines. It is estimated that many millions of tons of coal lie undeveloped in the section about to be tapped. Former Representative James H. Mays heads the $1,000,000 company which will construct the road. The company will be permitted to retain for a period of 10 years any revenues which it receives from operating the line in excess of 5.75 per cent of the capital invested.

The Columbia Steel Corp. will construct the first unit of its blast furnace immediately, the contract having already been let.

VIRGINIA

E. White Atkinson has opened offices in Norfolk to represent the Coal River Collieries, owned and operated by the Brotherhood of Locomotive Engineers. This is the first time this company has made an effort to handle its coal through an agency here. An unfavorable freight rate has made it impossible for these mines to compete in the Hampton Roads trade, but arrangements have been made with the Chesapeake & Ohio Ry. whereby this rate is placed on a basis for competition with other coal dealers.

The Old Virginia Coal Co., has been incorporated at St. Charles with a capital of $10,000 and with E. B. Cullen as president and E. L. Fuller as secretary.

The City of Norfolk will receive bids this week for 12,000 tons of coal of mixed grades, to be delivered beginning April 1. The bidding, usually, is confined somewhat largely to local wholesalers. No announcement has been made of other bids being asked at any time soon.

WEST VIRGINIA

When a state road is damaged through loss of material support resulting from the removal of coal adjoining the right of way, a coal company is responsible, according to an opinion of Attorney General E. T. England of West Virginia.

The Gulf Smokeless Coal Co. and the **Gulf Coal Co.,** both of Beckley, have changed their principal office from Beckley to Tams. W. P. Tams, of Tams, is the president of both of the companies. The Logan Fuel Co. will hereafter have its principal office at Charleston instead of Huntington.

The Jack Run Coal Co., which was recently incorporated with a capital of $60,000, has perfected its organization with the election of John Batturo as president and William D. Andrea as secretary. The company has 24 acres of coal land under development and expects to add to this holding to make the daily output 250 tons.

The Fire Creek Pocahontas Fuel Co. of Huntington, which was recently incorporated with a capital stock of $150,000, has organized by electing the following officers: President, C. B. Lee; Secretary, William J. Harvie; Manager; Harold E. Wilson. The company succeeds the Hump Mountain Smokeless Coal Co. It contemplates making extensive repairs and installing new machinery, so as to develop 200 acres of coal land to produce a daily output of 350 tons.

Among the recent West Virginia companies to place orders for Nolan automatic feeders are the Grey Eagle Coal Co. for their Grey Eagle No. 1 mine, the Flat-Top Pocahontas Coal Co. at Herndon, and the American Coal Co. at McComas.

Holdings of Sewickley coal in the Scott's Run field of Monongalia County have been materially increased by **E. H. Gilbert** and **R. M. Davis,** operators in that field, through the purchase of 138 acres of coal land in Cass district.

The Andrew Coal Co., operating at Granville, on the Monongahela Ry., in Monongahela County, has been sold to Fred Tropf and Frank L. Bowman of Morgantown for the sum of approximately $150,000 and in the future its mine will be operated by the **Tropf-Bowman Coal Co.,** with general offices in Monongalia County.

The Blackfield mines, hitherto owned and operated by **F. B. and J. M. Black** and associates as a portion of the Atlantic Coal Co. operations, **have passed into new hands,** the Blacks having disposed of their entire interests in the property, which had been in litigation for some time. Frank Romesberg, of Salisbury, is president of the new company; C. M. Bird, vice-president and superintendent; John Kretchman, secretary, and Norman Romesberg of Garrett, treasurer. Included in the deal are 1,000 acres of coal, together with tipple and bin which has a capacity of 600 tons, 200 mine cars, two steam dinkey engines, two electric motors and all other equipment that was used in operating the Blackfield mines.

The Edna Gas & Coal Co. of Fairmont, which was recently incorporated with a capital of $1,500,000, has been organized with the election of R. M. Hite as president. The company has purchased from the Jamison Coal & Coke Co. their Lehigh and No. 11 mines, with a daily capacity of 1,000 tons. The company plans to install additional equipment, which will increase the output of the plants to 2,000 tons a day.

The Main Island Creek Coal Co. at Omar has been incorporated with a capital of $25,000 by J. Henry Bell and W. H. Courtney of Lexington, and W. H. Hoover of Nicholasville, Ky.

The Weyanoke Coal & Coke Co. of Springton, of which R. D. Patterson is president, has consolidated with the **A. J. Patterson Pocahontas Co.** and the capital increased to $1,000,000.

The Richland Coal Co., of Wheeling, has increased its capital from $200,000 to $600,000.

H. H. Randolph and associates, of Burch, plan to organize the **Milestone Coal Co.** and to invest $1,000,000 in coal properties.

Cleveland people, including F. M. Kirk and others, having acquired the capital stock of the Melrose Coal Co. of Fairmont, have also **leased the mine of the Consolidation Coal Co.** at Enterprise. The company will operate under the name of the Melrose Coal Co. Pittsburgh coal is produced at the Enterprise mine, which has a capacity of from eight to ten cars of coal a day. The Melrose company is capitalized at $100,000.

Directors and officers were elected at the annual meeting of the **Atlantic Smokeless Coal Co.** held in Welch, on Feb. 27. The board as elected will be composed of the following: George Wolfe, Beckley; W. M. Black, of Lynchburg, Va.; Dr. C. R. Woolwine, of Davy; Dr. J. Howard Anderson, of Marytown; Richard Hancock of Lynchburg, Va.; J. B. Clifton, of Beckley; A. F. Wysong, of Princeton. Following the election of the board of directors, that body selected the following officers: George Wolfe, Beckley, president, treasurer and general manager; Dr. J. Howard Anderson, of Marytown, vice-president; W. M. Black, Lynchburg, secretary, and R. E. Brockman, superintendent. This company operates a mine at Asco, McDowell County, in the Tug River field. Before adjournment of the board of directors **a dividend of $26 a share was declared,** payable as of March 1.

In a $150,000 fire at Beckley late in February the Ernest M. Merrill Engineering Co. of Beckley, lost much valuable equipment, data, records, paraphernalia, etc. Within a period of 24 hours however the company had rehabilitated itself in temporary quarters and was ready to transact business as usual.

The Westmoreland Coal Co., of Philadelphia **paid $120 an acre for 5,500 acres of coal land** on Ford Fork of Little Coal River owned by the Laurel Coal & Land Co., of which Major J. E. Chilton and former Senator William E. Chilton were the largest stockholders. Through this purchase the Westmoreland company becomes one of the largest holders of coal land in southern West Virginia.

Under the terms of the **Byrer Bill** (Senate Bill No. 360), which its sponsor states is **patterned after the anthracite tax bill in Pennsylvania,** there would be levied upon every net ton of coal mined, washed, screened or otherwise prepared for market in West Virginia a tax of 2 per cent of the gross value thereof when prepared for market. Such a tax would be assessed at the time the coal was mined. Taxes so received would be placed to the credit of the "state producers' depletion fund," 50 per cent of which would be paid to the State Road Commission to be applied to the payment of interest and sinking fund, and 50 per cent of which would be paid to the boards of education in each county in the state.

Authority has just been granted by the directors of the **West Virginia Coal & Coke Co. to improve the Norton plant** of the company in Randolph County which will involve an expenditure of between $50,000 and $60,000, including the construction of a new store building, an office building, a central warehouse or supply house, a machine shop and complete equipment and a general repair shop to repair mine cars and motors. The company also will construct a macadam road leading to the Norton plant as well as a concrete bridge across Grassy Run. The office of the company physician, superintendent, chief electrician and others connected with the plant in an executive and clerical capacity will be in the new office building. Work will be begun as soon as plans and specifications can be drawn. The Norton plant is the largest of the West Virginia Coal & Coke Co., having a capacity of about 2,500 tons of coal a day.

The invasion of Logan County by representatives of **the American Civil Liberties Union,** which had been widely advertised for several weeks, **failed to make much of an impression** in the vicinity of the mining center. The party of speakers addressed perhaps 1,000 people from the court house steps in the city of Logan, on Sunday night, March 4. Instead of encountering opposition, as members of the party had indicated they expected, they were given an opportunity to present their arguments and to test the "right of free speech." The addresses were mild. Those of Heber Blankenhorn, of the Bureau of Industrial Research, and of the Rev. Henry S. Huntington, associate editor of the *Christian Work*, made little or no impression and met with no response. That of Arthur Garfield Hays, being of a humorous nature and dealing with his experiences in Pennsylvania, excited the risibilities of the crowd.

Not only have extensive improvements been made at the No. 1 mine of the **Pond Creek Coal Co.,** of which J. C. Sullivan is president, but it is now proposed **to build two miles of railroad** in order to permit the further development of the property. A contract has been let for the railroad construction to the No. 2 mine, where a modern plant will be built, fully equipped and capable of producing from 2,000 to 3,000 tons of coal a day. At the No. 1 mine the finishing touches have just been put on an all-steel tipple and it is proposed to build additional mining houses, all with a view to increasing the output of the No. 1 mine, which adjoins the property recently acquired by the Ford Motor Co.

WISCONSIN

Frank R. Bacon was elected **president of the Cutler-Hammer Co.** of Milwaukee, at a recent meeting of stockholders. The only change in the nine officers who also constitute the board of directors was the election of F. L. Pierce as vice-president in place of A. W. Berresford, who retired. The other officers of the company are as follows: Second Vice President, B. L. Worden; Treasurer, F. L. Pierce; Assistant Treasurer, L. F. Vogt; Secretary, T. E. Barnum; Manager of Operations, H. J. Wiegand; General Sales Manager, W. C. Stevens; Assistant to the president, J. C. Wilson; Director of Purchases, W. S. Hopkins.

WYOMING

According to Denver newspapers, the **Chicago, Burlington & Quincy R.R. is planning the construction of a $2,500,000 branch railroad in northeastern Wyoming and southeastern Montana** to tap the semi-bituminous coal fields of that region. Right-of-way from Sheridan, northeast into the Rosebud District, is being purchased by agents of the railroad. Construction is to start this spring.

"The new road will be a sixty-mile branch and will start from the main line which runs from Billings, Mont., through the southwest corner of South Dakota, through Nebraska, and into the network of Burlington lines which lead into Chicago, Kansas City, St. Louis and Omaha."

It is also reported that the Northern Pacific railway is about to build a similar line south from its main line, taking off at Forsyth and extending into the same fields. The Northern Pacific, already operating mines at Red Lodge, is expected to develop large stripping operations in the district.

CANADA

A resolution empowering the Standing Committee on Mines and Minerals to inquire into coal supplies, costs, transportation, desirable inter-provincial action and other **means whereby Canada may be rendered self-sustaining as regards bituminous coal**, is to be moved in the House of Commons at Ottawa, this session, by a Nova Scotia member who asks that the committee inquire into the necessity and possibility of supplying substitutes for coal.

That the government feels that **no good purpose would be served by appointing a special committee of the House to consider Canada's fuel problem** with a view to the adoption of a national and British coal policy for Canada, was the information given in the House at Ottawa a few days ago in answer to a question placed on the order paper by T. L. Church, North Toronto.

Because of the fact that no election of officers was held for District 26, United Mine Workers of America, which, according to the district constitution, must be held on the second Tuesday of December of each year, Springfield Local has forwarded a resolution to the International Executive Committee in which it is **requested that President Lewis take immediate action to enforce the constitution.**

At a well-attended meeting of the Associated Boards of Trade of eastern British Columbia, at Trail, on Feb. 22, it was resolved that **"price adjustments in the coal industry are long overdue,** and that, in the interest of the industry itself, dependent industries and the general public such adjustments should be made forthwith, and that the Dominion Government should probe the whole situation."

The British Empire Steel Corporation, which aims at an output of 400,000 tons of coal this year, made a good beginning in January, considering that much idleness was caused by severe storms. The output for the month shows an increase of 175,000 tons over that of January, 1922. In order to carry out its plans its **transportation equipment will be renewed on a large scale.**

Traffic News

Freight cars of all descriptions **on order by railroads** on Feb. 15 **totaled 97,932,** according to a report by the Car Service Division of the American Railway Association. This was an increase of 29,600 over the number on order on Jan. 1 last and 6,578 more than were on order on Feb. 1 last. Of the total orders placed, 49,646 are for box cars, an increase of 14,029 since Jan. 1. **Coal cars on order totaled 37,680,** an increase since the first of the year of 13,462. Reports up to Feb. 15 also showed that orders had been placed for 1,915 locomotives, which was an increase of 470 over the number on order on Jan. 1 last. Of the total number ordered, **1,407 were** freight locomotives, 376 passenger and 132 switch engines.

New equipment ordered by the Pennsylvania Railroad system to be placed in service this year—some of it already being delivered—involves an expenditure of more than $57,000,000. In order to handle its share of the country's growing business—normally about 11 per cent of the freight and 17 per cent of the passenger traffic of the nation—the company is making large additions to its present car and locomotive capacity. Since the first of this year the Pennsylvania has ordered 500 new steam locomotives. Last fall work was started on changing 50-ton trucks to 70-ton trucks under about 10,000 coal cars, which will increase the capacity of these cars by approximately 31 per cent.

The New York Central R.R. has been ordered by the Ohio Public Service Commission to join its lines at Hopedale with the Pittsburgh & West Virginia Ry. Coal operators complained that the lack of such a connection was causing them great loss and preventing the proper distribution of coal in Ohio. The case is scheduled to be argued before the Interstate Commerce Commission on March 27.

In pursuance of a recommendation by the Federal Fuel Distributor the Interstate Commerce Commission issued March 5 **Service Order No. 39,** directing the New York, New Haven & Hartford R.R. **to permit the docking of the vessel Maumee out of its turn** at Belle Dock, New Haven, Conn., so as to provide coal to meet an emergency at the plant of the Springfield Gas Light Co. at Springfield, Mass. This order was necessary because of the regulations that vessels must be docked in turn. There were 23 ships ahead of the Maumee, which was carrying coal for the gas light company. On the showing that the coal supply of the company will have been exhausted prior to the docking of the Maumee in turn, the Interstate Commerce Commission issued its service order and also authorized priority in the placement of cars for the transportation of the coal from New Haven to Springfield.

Adjustment of Lake freight rates is being sought by operators from northern West Virginia who attended a conference early in March in Washington at which complaint was made that all-rail rates from southern Illinois were discriminatory. Representatives of the railroads said that there would be no change in the rates. The coal operators however propose to appeal directly to the presidents of the various Lake coal-carrying railroads and hope to obtain a reduction of 57c. a ton as compared with present rates, such a reduction to be absorbed by the railroads and the boat owners. It is contended by northern West Virginia shippers that inequitably low all-rail rates will interfere with the movement of a larger tonnage over the Great Lakes.

Coal dealers conferred recently with officials of the Virginian and Norfolk & Western railways regarding the **proposal** of the latter **to discontinue barging coal to waterfront customers.** No decision was reached. The proposal was scheduled to be effective April 1, but no tariffs have been published and the regulation cannot go into effect at that time.

Shipments of railroad locomotives from the principal manufacturing plants **declined slightly in February,** according to figures published by the Department of Commerce from compilations by the Bureau of the Census. Unfilled orders, however, reached a new high record at 2,220 locomotives at the end of February, an increase of 432 during the month. Both shipments and unfilled orders on foreign account continue to decline and now form but a small proportion of the total.

Association Activities

Clarksburg Coal Club

At the last meeting of the Clarksburg Coal Club of Clarksburg, W. Va., the opinion prevailed that lack of direct rail connection to New England was penalizing mines on the Baltimore & Ohio and led to an expression of hope that it might be possible to induce the Pennsylvania R.R. to extend its line from Fairmont to Clarksburg. Among those who spoke at the meeting were A. Lisle White, formerly president of the Northern West Virginia Coal Operators' Association, and "Uncle Dan" Howard, one of the well known operators of northern West Virginia. It was stated during the discussion that operators on the Pennsylvania near Fairmont were able to obtain as much as $1 a ton more for their product than operators on the Baltimore & Ohio, just across the Monongahela River from the Pennsylvania. It also was stated that the operators on the Pennsylvania system could ship direct to New England, whereas the B. & O. is unwilling to accept shipments to New England states owing to the difficulty in having cars returned. Clarksburg operators desire the Pennsylvania extended to Clarksburg not only because it will enable them to broaden their markets, but will afford them better transportation facilities than they assert they are now receiving.

Obituary

Milton Graves, 58 years old, operator of a small coal mine near Carbon, Ind., committed suicide recently by shooting himself through the head with a large revolver. He leaves a widow. No cause was given for the act.

Henry E. Patrick, 71, vice-president of C. M. Moderwell & Co. at Chicago, died Feb. 28, in a hospital near his home in Oak Park, a Chicago suburb. Death followed a stroke of paralysis. Mr. Patrick left the dry goods business in Chicago 20 years ago to join the Moderwell organization and was one of the first sales managers to handle Franklin County (Illinois) coal, now a leader among Western fuels. Mr. Patrick remained sales manager until 1917, when he was made vice-president and a director of the company. Burial was in Marengo, Ill.

Charles T. Boynton, 65, vice-president of Pickands, Brown & Co., a coal, coke and iron concern of Chicago, died of pneumonia Feb. 28 at his home in Highland Park, near Chicago. He was also vice-president and a director of the By-Products Coke Corporation, of Chicago.

M. L. Marks, a well-known coal salesman in Chicago for Walter Bledsoe & Co., an Indiana operating concern, died **Feb. 28.** He was once with the Dering Coal Co. and later with the Lill, Robinson Coal Co., which was absorbed by the Consumers Co.

Coming Meetings

International Railway Fuel Association will hold its spring convention at the Hotel Winton, Cleveland, Ohio, May 21-24. Secretary-treasurer, J. G. Crawford, Chicago, Ill.

The American Mining Congress will hold its twenty-sixth annual convention in conjunction with the **National Exposition of Mines and Mining Equipment,** Sept. 24-29, at the Milwaukee Auditorium, Milwaukee, Wis. Secretary, J. F. Callbreath, Washington, D. C.

Indiana Retail Coal Merchants' Association will hold its annual meeting April 25 and 26 at the Severin Hotel, Indianapolis, Ind. Secretary, R. R. Yeagley, Indianapolis, Ind.

International Chamber of Commerce will hold its second general meeting in Rome, Italy, March 19-26.

American Society for Testing Materials will hold its annual meeting at the Chalfonte-Haddon Hall Hotel, Atlantic City, N. J., beginning June 25 and continuing throughout the week. Secretary, E. Marburg, Philadelphia, Pa.

The Colorado & New Mexico Coal Operators' Association will hold its annual meeting June 20 at Denver, Col. Secretary, F. O. Sandstrom, Denver, Col.

The Electric Power Club's annual meeting will be held at the Homestead, Hot Springs, Va., Dec. 11-14. Executive secretary, S. N. Clarkson, Cleveland, Ohio.

National Foreign Trade Council will hold its annual conference May 2-4 at New Orleans, La. Secretary, O. K. Davis, 1 Hanover Square, New York City.

The Gas and Fuel Section of the American Chemical Society is arranging a second sectional meeting at the New Haven meeting of the American Chemical Society during the first week in April. The section program will consist of papers on gas and fuel chemistry and a symposium on motor fuels, held jointly with the petroleum division.

The eleventh annual meeting of the Chamber of Commerce of the United States will be held in New York City May 7-10.